EMC TEST REPORT

Test Report No.: 12688558Y-B

Applicant:	**JVC KENWOOD Corporation**
Type of Equipment:	**GPS NAVIGATION SYSTEM**
Model No.:	**DNX419DABS**
Test standard:	**EN 55032:2015 Class B** **EN 55032:2012 Class B**
Test Result:	**Complied (Refer to Section 3.2)**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above standard.
4. The test results in this test report are traceable to the national or international standards.
5. This test report covers EMC technical requirements. It does not cover administrative issues such as Manual or non-EMC test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Yokowa EMC Lab.
7. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
8. The information provided from the customer for this report is identified in Section 1.

Date of test:

February 5 to 21, 2019

Representative test engineer:

Hiromichi Nakai
Engineer
Consumer Technology Division

Approved by:

Makoto Toyoda
Leader
Consumer Technology Division

RTL02610

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

UL Japan, Inc.
Yokowa EMC Lab.
108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN
Telephone: +81 596 24 8750
Facsimile: +81 596 39 0232

REVISION HISTORY

Original Test Report No.: 12688558Y-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12688558Y-B	February 27, 2019	-	-

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Section 1: Customer information

Company Name	:	JVC KENWOOD Corporation
Address	:	2967-3 Ishikawa-machi, Hachioji-shi, Tokyo, 192-8525 Japan
Telephone Number	:	+81-42-646-5525
Facsimile Number	:	+81-42-646-1440
Contact Person	:	Seigo Tsutsumi

The information provided from the customer is as follows;
- Applicant, Type of Equipment, Model No. on the cover and other relevant pages
- Section 1: Customer information
- Section 2: Equipment under test (E.U.T.)
- Section 4: Operation of E.U.T. during testing

* The laboratory is exempted from liability of any test results affected from the information in Section 2 and 4.

Section 2: Equipment under test (E.U.T.)

2. 1 Identification of E.U.T.

Type of equipment	:	GPS NAVIGATION SYSTEM
Model No.	:	DNX419DABS
Serial No.	:	Refer to Clause 4.2
Rating	:	DC 12 V
Country of Mass-production	:	Indonesia
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Size	:	178 x 100 x 155 (Width x Depth x Height (mm))
Receipt Date of Sample (Information from test lab.)	:	February 5, 2019 (Conducted emission, Antenna terminal and Radiated emission (Above 1 GHz) test) February 19, 2019 (Radiated emission (Below 1 GHz) test)

2. 2 Product description

Model: DNX419DABS (referred to as the EUT in this report) is a GPS NAVIGATION SYSTEM.

General Specification

Clock frequency(ies) in the system : 6.2208 GHz (Maximum)

Section 3: Test specification, procedures and results

3. 1 Test specification

EMI

Title : EN 55032:2015/ EN 55032:2012
Electromagnetic compatibility of multimedia equipment - Emission requirements

Purpose of test : Compliance for the EMC directive, 2014/30/EU

3. 2 Procedures & results

EMI : EN 55032:2015/ EN 55032:2012

Item	Test Procedure	Limits	Deviation	Worst margin	Results	Remarks
Conducted emission	Clause 7 of CISPR 16-2-1	EN 55032:2015 EN 55032:2012 Class B Table A.10 (AC main) Table A.12 (Asymmetric mode)	N/A	20.17 dB (1.96000 MHz, QP, 3.DAB Reception)	Complied a)	*1)
Radiated emission	Clause 7.3 of CISPR 16-2-3	EN 55032:2015 EN 55032:2012 Class B Table A.4.1 (up to 1 GHz, 10 m) Table A.5.1, A5.2 (above 1 GHz)	N/A	5.04 dB (162.016 MHz, QP, Vertical, 6.USB) (162.000 MHz, QP, Vertical, 4.DVD)	Complied b)	-
Conducted differential voltage emission	C.4.2 of EN 55032 C.4.2 of CISPR 32	EN 55032:2015 EN 55032:2012 Table A.13	N/A	15.8 dB (933.333 MHz, 3.DAB Reception)	Complied c)	-

*1) Conducted emission test was applied at tuner port which was the test object.
The test is not applicable since the EUT does not have other ports of test object.
Note : UL Japan's EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0414.

a) Refer to Appendix 2 (data of Conducted emission)
b) Refer to Appendix 2 (data of Radiated emission)
c) Refer to Appendix 2 (data of Conducted differential voltage emission)

Symbols:
Complied The data of this test item has enough margin, more than the measurement uncertainty.
Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

3. 3 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.
The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor *k* = 2.

EMI

		Open area test site			Shielded room				Ucispr (±)
		No.1	No.2	No.3	No.1	No.2	No.3	No.7	
		(±)	(±)	(±)	(±)	(±)	(±)	(±)	
Conducted disturbance									
LISN (AMN)	9 kHz - 150 kHz	3.8 dB							3.8 dB
	150 kHz - 30 MHz	3.4 dB							3.4 dB
ISN (LCL= 55 dB - 40 dB)	150 kHz - 30 MHz	4.2 dB							5.0 dB
ISN (LCL= 65 dB - 50 dB)	150 kHz - 30 MHz	4.6 dB							5.0 dB
ISN (LCL= 75 dB - 60 dB)	150 kHz - 30 MHz	5.0 dB							5.0 dB
ISN (Screened)	150 kHz - 30 MHz	3.4 dB							5.0 dB
ISN (75 ohm)	150 kHz - 30 MHz	3.4 dB							5.0 dB
Current probe	150 kHz - 30 MHz	2.9 dB							2.9 dB
Capacitive Voltage Probe	150 kHz - 30 MHz	3.8 dB							3.9 dB
Voltage probe	150 kHz - 30 MHz	2.9 dB							2.9 dB
Radiated disturbance									
3 m	9 kHz - 30 MHz	3.3 dB	3.4 dB	3.4 dB	-	-	-	-	Not Defined
	30 MHz - 200 MHz (Horizontal)	4.6 dB	4.5 dB	4.7 dB	-	-	-	-	6.3 dB
	30 MHz - 200 MHz (Vertical)	4.7 dB	4.7 dB	4.9 dB	-	-	-	-	6.3 dB
	200 MHz - 1000 MHz (Horizontal)	4.9 dB	5.2 dB	5.2 dB	-	-	-	-	6.3 dB
	200 MHz - 1000 MHz (Vertical)	6.1 dB	6.2 dB	6.2 dB	-	-	-	-	6.3 dB
	1 GHz - 6 GHz	4.9 dB			-	-	-	-	5.2 dB
	6 GHz - 18 GHz	5.2 dB			-	-	-	-	5.5 dB
10 m	9 kHz - 30 MHz	3.1 dB	3.3 dB	3.2 dB	-	-	-	-	Not Defined
	30 MHz - 200 MHz (Horizontal)	4.6 dB	4.5 dB	4.7 dB	-	-	-	-	6.3 dB
	30 MHz - 200 MHz (Vertical)	4.5 dB	4.5 dB	4.8 dB	-	-	-	-	6.3 dB
	200 MHz - 1000 MHz (Horizontal)	4.7 dB	4.9 dB	4.9 dB	-	-	-	-	6.3 dB
	200 MHz - 1000 MHz (Vertical)	4.7 dB	5.0 dB	5.0 dB	-	-	-	-	6.3 dB
	1 GHz - 18 GHz	5.1 dB			-	-	-	-	Not Defined
Antenna terminal voltage									
30 MHz - 1000 MHz		3.8 dB							Not Defined
1 GHz - 2.15 GHz		3.9 dB							Not Defined
Disturbance power									
30 MHz - 300 MHz		3.7 dB							4.5 dB

3. 4 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

3. 5 Confirmation

UL Japan, Inc. hereby confirms that E.U.T. , in the configuration tested, complies with the specifications EN 55032:2015 Class B and EN 55032:2012 Class B.

3. 6 Test Location

UL Japan, Inc. Yokowa EMC Lab.
108 Yokowa-cho, Ise-shi, Mie-ken, 516-1106 JAPAN
Telephone number : +81 596 24 8750
Facsimile number : +81 596 39 0232

	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 open area test site	2973A-1	-	40 x 20	-
No.2 open area test site	2973A-2	-	20 x 18	-
No.3 open area test site	2973A-3	-	20 x 18	-
No.1 shielded room	-	5.5 x 6.4 x 2.7	5.5 x 6.4	-
No.2 shielded room	-	4.5 x 3.6 x 2.7	4.5 x 3.6	-
No.3 shielded room	-	3.6 x 7.2 x 2.4	3.6 x 7.2	-
No.4 shielded room	-	5.5 x 5.0 x 2.4	4.35 x 3.35	-
No.5 shielded room	-	5.5 x 4.3 x 2.5	5.54 x 3.0	-
No.6 shielded room	-	5.2 x 3.2 x 2.9	5.2 x 3.2	-
No.7 shielded room	-	9.3 x 3.4 x 2.7	9.3 x 3.4	-
No.1 EMS lab. (Full-anechoic chamber)	-	5.0 x 8.0 x 3.5	-	-
No.2 EMS lab. (Full-anechoic chamber)	-	4.0 x 7.0 x 3.5	-	-

3. 7 Test setup, Data of EMC & Test instruments

Refer to Appendix 1 to 3.

Section 4: Operation of E.U.T. during testing

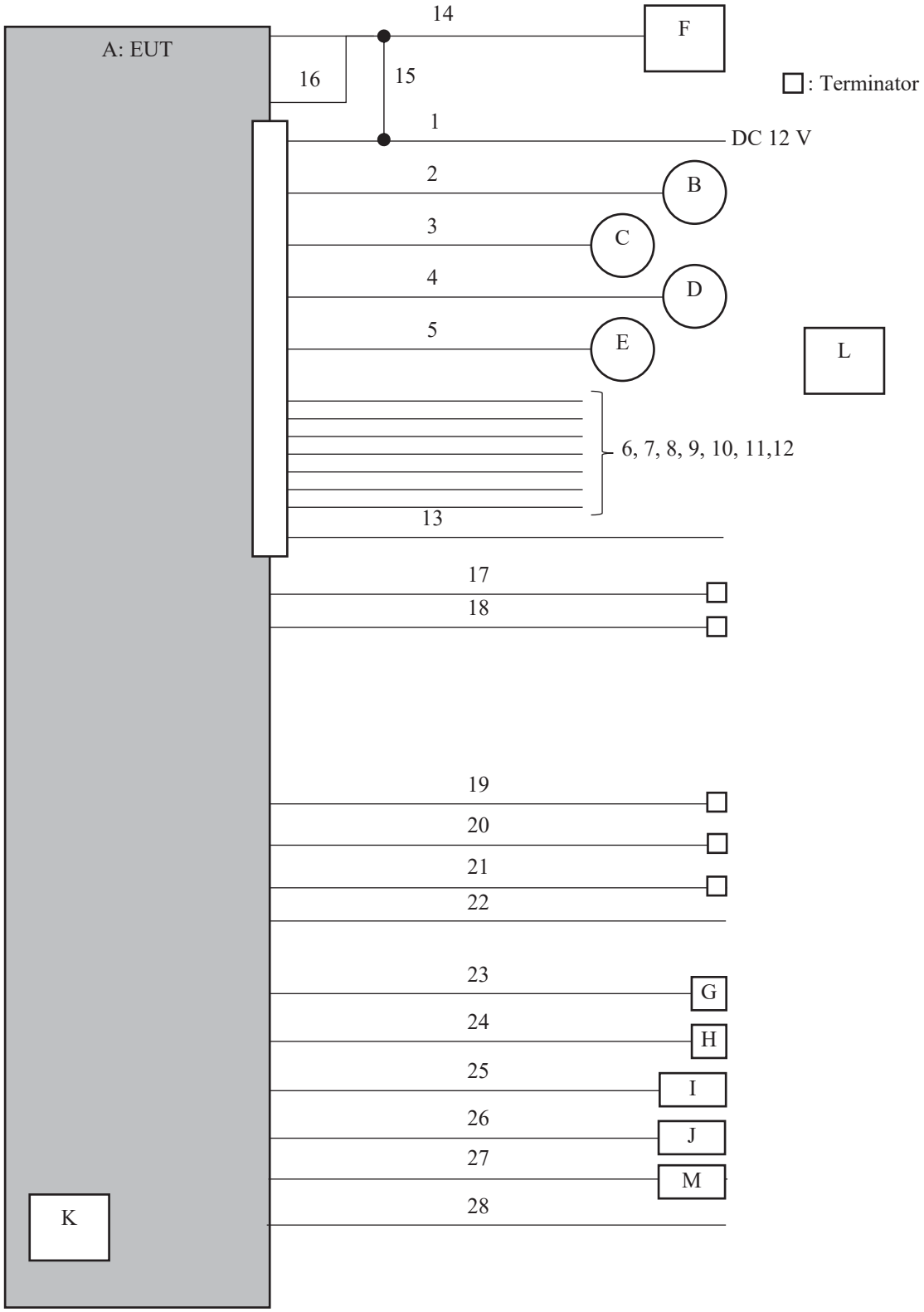
4. 1 Operating modes

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test sequence is used :
1. AM reception
2. FM reception
3. DAB Reception (Band III)
4. DVD Play
5. HDMI-In
6 .USB Play

Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4. 2 Configuration and peripherals



*Cabling and setup were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	GPS NAVIGATION SYSTEM	DNX419DABS	PE-X0016	JVC KENWOOD	EUT
B	Dummy Load	-	–	–	–
C	Dummy Load	-	–	–	–
D	Dummy Load	-	–	–	–
E	Dummy Load	-	–	–	–
F	DRIVE RECORDER	DRV-N520	161T0476	JVC KENWOOD	-
G	GPS Antenna	-	-	JVC KENWOOD	-
H	Microphone	-	-	JVC KENWOOD	-
I	USB Memory	128M	8	Bestrunner	-
J	USB Memory	128M	13	Bestrunner	-
K	microSD MEMORY CARD	UHS-I	1351CW48533	TOSHIBA	-
L	Remote Controller	RC-DV331	-	JVC KENWOOD	-
M	DAB Antenna	-	-	JVC KENWOOD	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC (ACC, B+, GND)	3.0 + 0.5	Unshielded	Unshielded	-
2	Speaker	0.15 + 1.0	Unshielded	Unshielded	-
3	Speaker	0.15 + 1.0	Unshielded	Unshielded	-
4	Speaker	0.15 + 1.0	Unshielded	Unshielded	-
5	Speaker	0.15 + 1.0	Unshielded	Unshielded	-
6	ANT. CONT	0.15 + 1.0	Unshielded	Unshielded	-
7	P. CONT	0.15 + 1.0	Unshielded	Unshielded	-
8	ILLUMI	0.15 + 1.0	Unshielded	Unshielded	-
9	REMOTE CONT	0.15 + 1.0	Unshielded	Unshielded	-
10	CAM +	0.15 + 1.0	Unshielded	Unshielded	-
11	CAM -	0.15 + 1.0	Unshielded	Unshielded	-
12	REVERSE	0.15 + 1.0	Unshielded	Unshielded	-
13	PRK SW	2.0	Unshielded	Unshielded	-
14	DASH CAM	3.5	Unshielded	Unshielded	-
15	DC	0.2	Unshielded	Unshielded	-
16	FRONT VIEW CAMERA	0.2	Shielded	Shielded	-
17	REAR VIEW CAMERA	0.2 + 1.5	Shielded	Shielded	-
18	VIDEO OUT	0.2 + 1.5	Shielded	Shielded	-
19	AV-OUT AUDIO	2.0	Shielded	Shielded	-
20	AV-IN	1.5	Shielded	Shielded	-
21	FM/AM Antenna	0.15 + 1.5	Shielded	Shielded	-
22	HDMI	1.0	Shielded	Shielded	-
23	GPS	3.5	Shielded	Shielded	-
24	Microphone	3.0	Shielded	Shielded	-
25	USB	0.2 + 1.0	Shielded	Shielded	-
26	USB	0.2 + 1.0	Shielded	Shielded	-
27	DAB Antenna	3.5	Shielded	Shielded	-
28	REMO IN	3.0	Shielded	Shielded	-

Section 5: Conducted emissions [EN 55032]

5. 1 Operating environment

The test was carried out in shielded room.
Temperature : See data
Humidity : See data

5. 2 Test configuration

Broadcast receiver port
EUT was placed on a platform of nominal size, 1 m by 2.3 m, raised 0.8 m above the conducting ground plane.
The voltage measurement for broadcast receiver port was performed at the measurement port of the ISN.
Those cables which touch ground plane are insulated by Carpet.
Photographs of the set up are shown in Appendix 1.

5. 3 Test conditions

Frequency range : 0.15 MHz - 30 MHz
EUT position : Table top

5. 4 Test procedure

The broadcast receiver port Continuous disturbance Voltage had been measured with the EUT in shielded room.
The EUT was connected to an ISN.
An overview sweep with peak detection has been performed.

The measurements had been performed with a quasi-peak detector and if required, with a CISPR average detector (CAV).
The conducted emission measurements were made with the following detector function of the test receiver.
Detector Type : QP / CAV
IF Bandwidth : 9 kHz / 9 kHz

5. 5 Results

Summary of the test results : Pass

Section 6: Radiated emissions [EN 55032]

6. 1 Operating environment

This test was carried out in open area test site.

Temperature	:	See data
Humidity	:	See data

6. 2 Test configuration

EUT was placed on a table which was consisted by polystyrene foam, polypropylene foam and polycarbonate of nominal size, 1 m by 1.5 m, raised 0.8 m above the conducting ground plane.
The rear of EUT was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle less than 0.4m long. The measurements were performed for vertical or horizontal antenna polarization or both as necessary. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.
Those cables which touch ground plane are insulated by Carpet.
Photographs of the set up are shown in Appendix 1.

6. 3 Test conditions

Frequency range	:	30 MHz - 6000 MHz
EUT position	:	Table top

6. 4 Test procedure

<Below 1 GHz>
The Radiated Electric Field Strength intensity has been measured on open area test site with a ground plane at a distance of 10 m*.
* Measuring distance
The boundary of the EUT is defined by an imaginary circular periphery.

Pre check measurements were performed in a screened room with a search coil at 30 - 1000 MHz to distinguish disturbances of EUT from the ambient noise.
Measurements were performed with a quasi-peak detector.
The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for vertical or horizontal antenna polarization or both as necessary.

<Above 1 GHz>
The radiated electric field strength intensity has been measured on open area test site with a ground plane. The distance is shown in Appendix 2.
Pre check measurements were performed in a screened room with a horn antenna at 1000 - 6000 MHz to distinguish disturbances of EUT from the ambient noise.
Measurements were performed with a Peak detector and an average detector.
EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The center height of EUT system (This height is shown in Table 1) was lower than 1 m, so the antenna height was fixed at 1 m.

The measurements were performed for vertical or horizontal antenna polarization or both as necessary.

Table 1. Horn antenna (BBHA9120D) Minimum dimension of *W* (Measurement distance = 3 m)

Frequency [GHz]	θ3dB [min]	Wmin [m]	**VD (EUT) [m]**	**VD (EUT system) [m]**	**CH [m]**
1.0	57.9	3.31	0.12	0.42	0.71
2.0	41.3	2.26			
3.0	32.1	1.72			
4.0	32.4	1.74			
5.0	35.8	1.93			
6.0	37.3	2.02			

θ3dB: The minimum 3 dB beam width of receive antenna.
W: The dimension of the line tangent to the EUT formed by θ3 dB at the measurement distance (3 m).
[*W*=2*d*tan(0.5* θ3 dB)]
VD (EUT): Vertical maximum dimension of EUT
VD (EUT system): Vertical maximum dimension of EUT system[m] (contained cable length: 0.3 m)
CH: Center height of EUT system[m] (contained cable length: 0.3 m)
*CH[m] =0.8[m] (Table height)-0.3[m] (consideration of cable length based on CISPR16-2-3) +VD(EUT system)[m]/2

The radiated emission measurements were made with the following detector function.

Frequency	:	30 MHz-1000 MHz	1000 MHz-6000 MHz *1)	
Instrument used	:	Test Receiver	Test Receiver	
Detector Type	:	QP	AV	PK
IF Band width	:	120 kHz	1 MHz	1 MHz

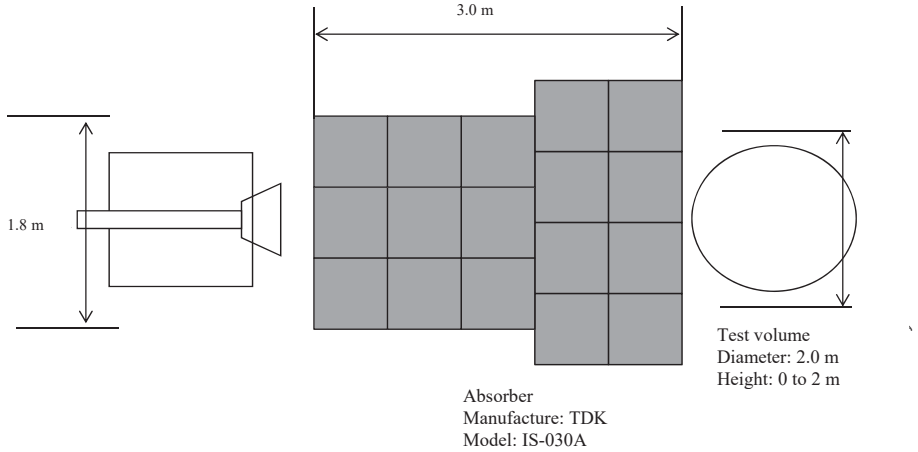
*1) The measurement data was adjusted to a 3 m distance using the following Distance Factor.
Distance factor: 20 log (Actual distance/3 m)
Distance factor and actual distance are shown in Appendix 2.

6. 5 Results

Summary of the test results : Pass

Figure. Absorber arrangement

3Site



Section 7: Conducted differential voltage emissions [EN 55032]

7. 1 Operating environment

The test was carried out in shielded room.

Temperature	:	See data
Humidity	:	See data

7. 2 Test configuration

The EUT was placed on a non-metallic table height of 0.8 m.
Photographs of the set up are shown in Appendix 1.

7. 3 Test conditions

Frequency range	:	30 MHz - 2150 MHz
EUT position	:	Table top

7. 4 Test procedure

The Disturbance Voltage from Antenna Terminal Test had been measured with the EUT.

a. Measurement of Antenna terminal disturbance voltage from local oscillator.
   Measurement of fundamental wave
   Measure disturbance voltage noise from local oscillator (Sum of receiving frequency and intermediate frequency). with the condition of receiving signal generated from signal generator at test channel.
   Measurement of Harmonics
   Measure harmonic noise (frequency which double, triplicate, quadruple… of local oscillator frequency within the specified frequency range) of fundamental frequency.
b. Measurement of Antenna terminal disturbance voltage occurred from other noise source.
   Measure disturbance voltage other than local oscillator with receiving discretional channel.

The colour bar signals specified in the standard were transmitted from a video generator and EUT was set in receiving condition.
The sound input signal (unmodulated) level should be 60dB(uV) for FM receiver.

The disturbance voltage from antenna terminal test was made with the following detector function of the test receiver.

		30-1000 MHz	1000-2150 MHz
Detector Type	:	QP	PK
IF Bandwidth	:	120 kHz	1 MHz

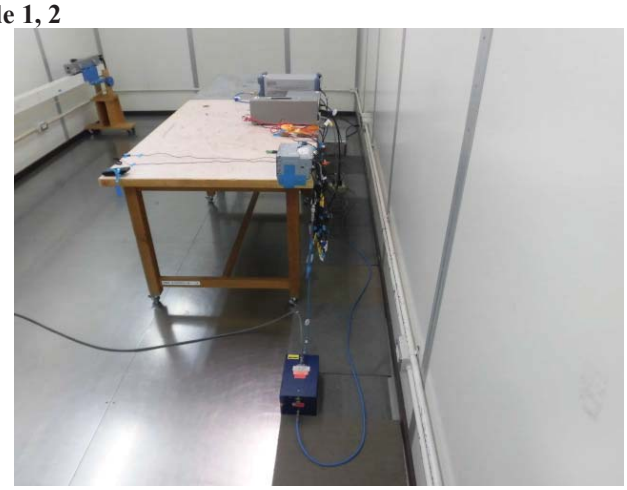
7. 5 Results

Summary of the test results	:	Pass

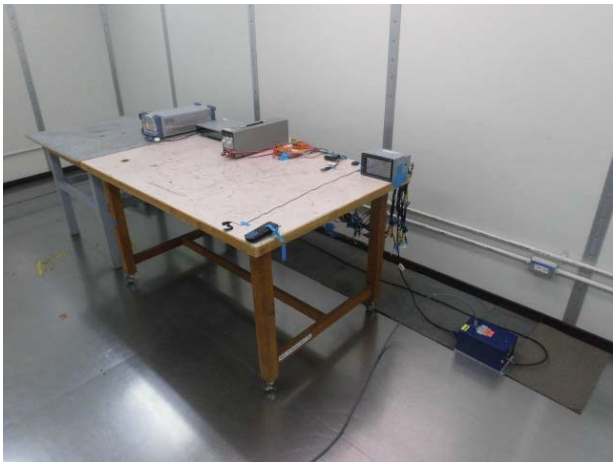
Appendix 1: Photographs of test setup

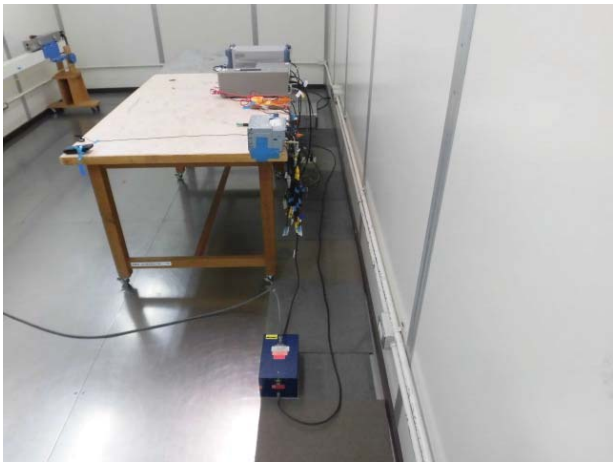
Conducted emissions [EN 55032]

Mode 1, 2



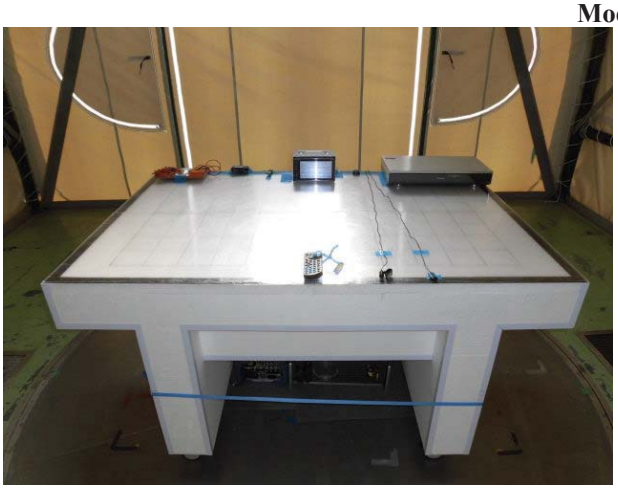
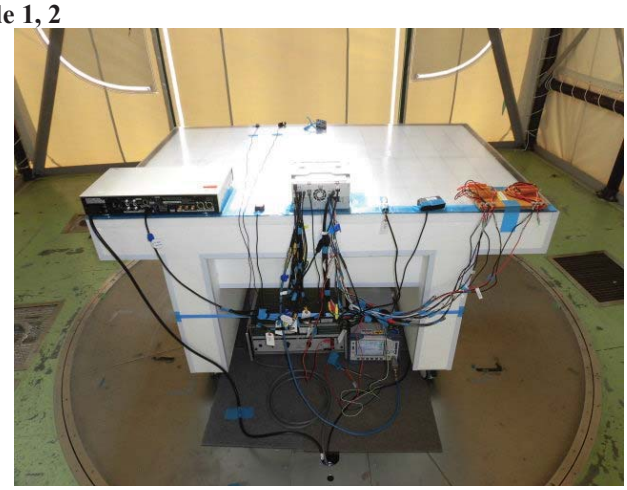
Mode 3





Radiated emissions [EN 55032]
Below 1 GHz

Mode 1, 2

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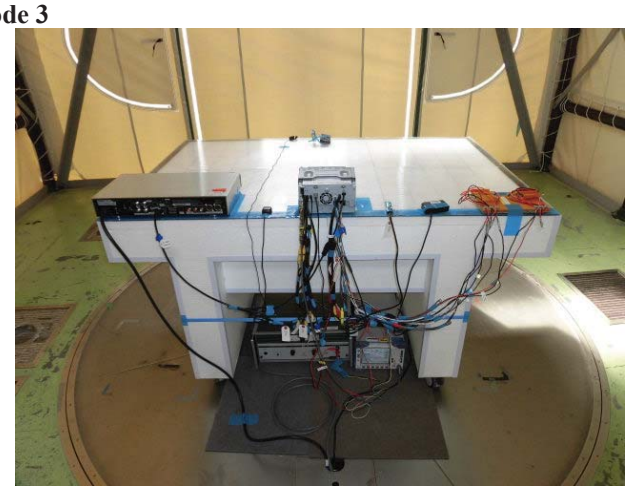
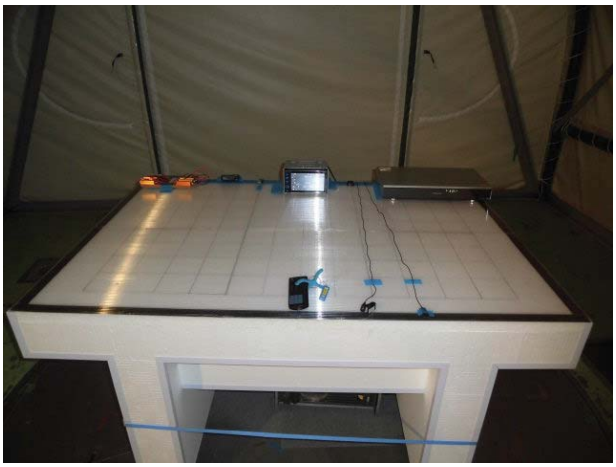
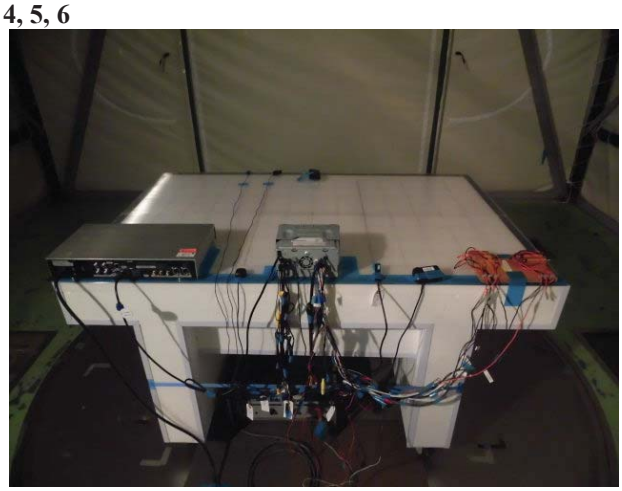
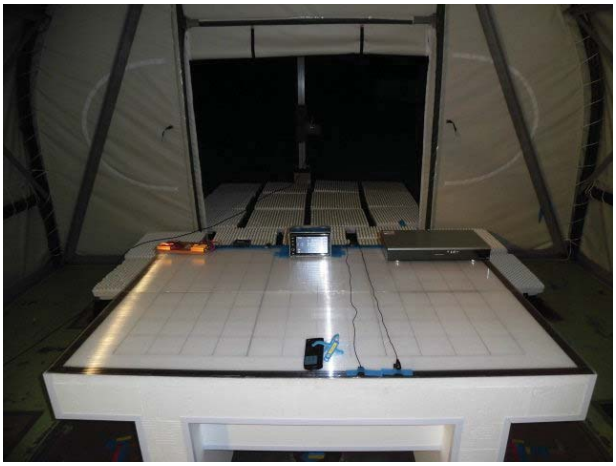
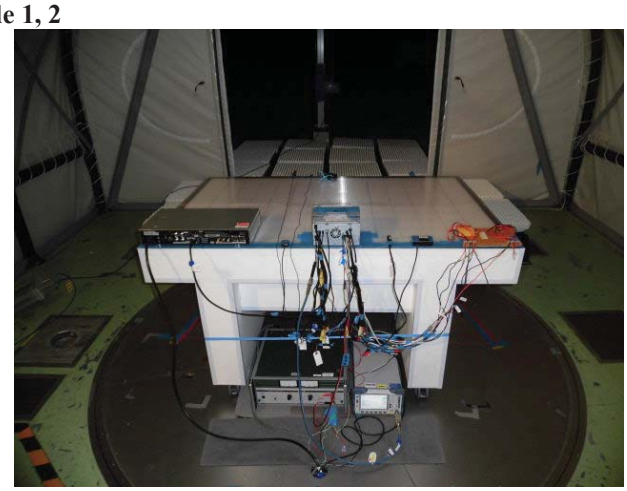


Mode 4, 5, 6

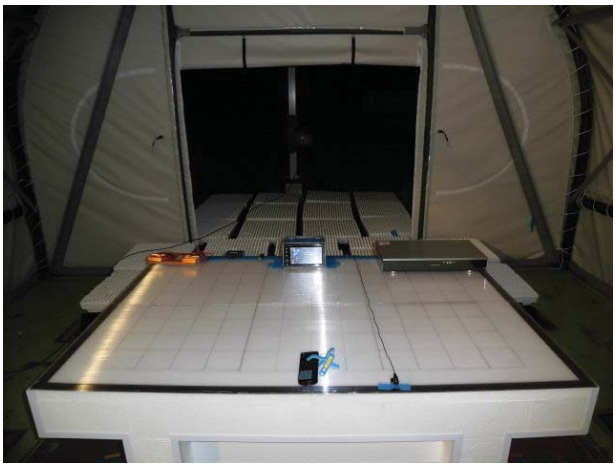
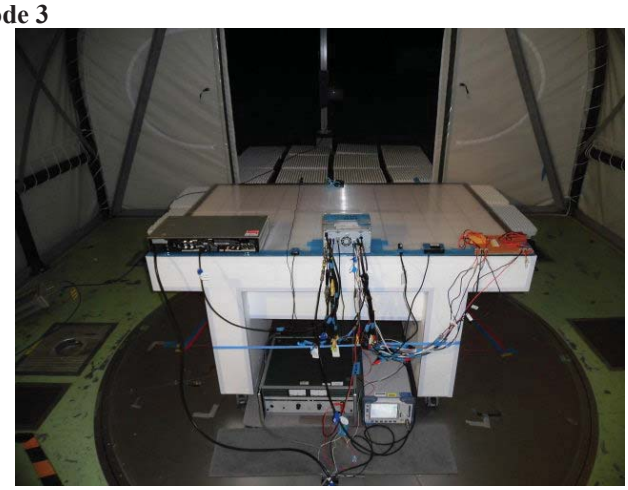



Radiated emissions [EN 55032]
Above 1 GHz

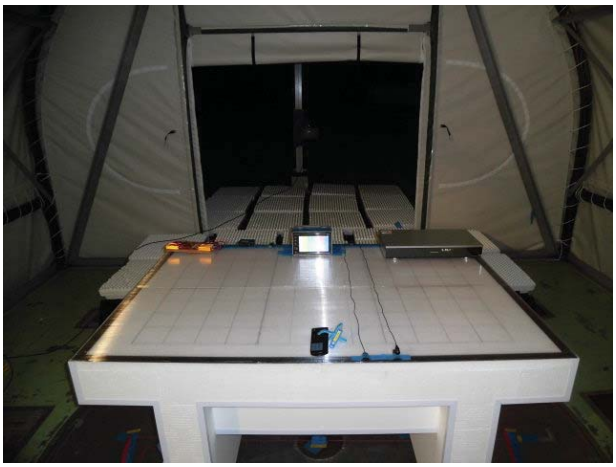
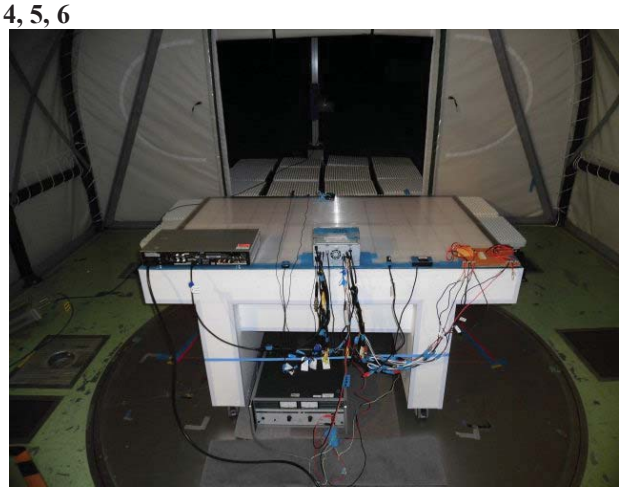
Mode 1, 2

Mode 3

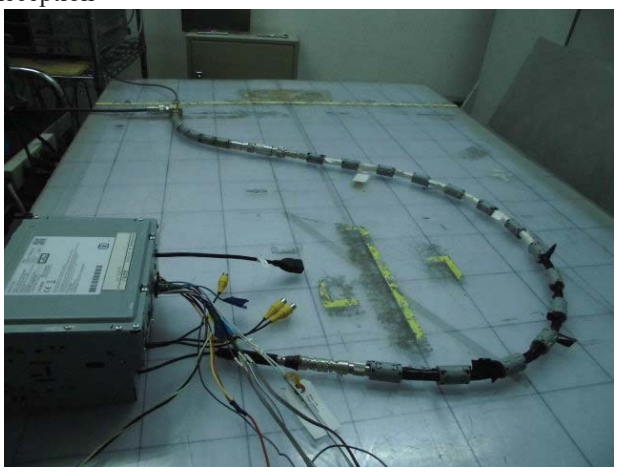



Mode 4, 5, 6

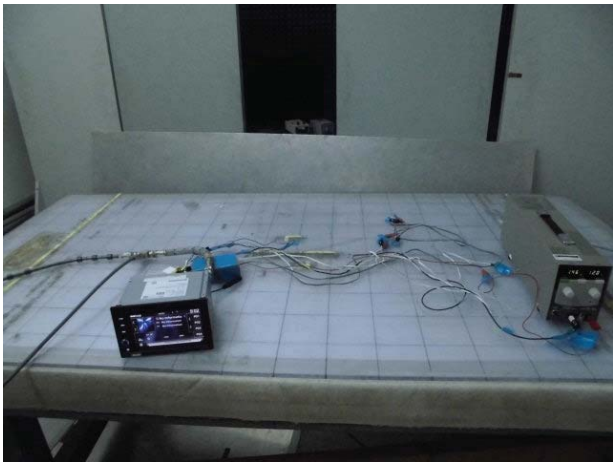



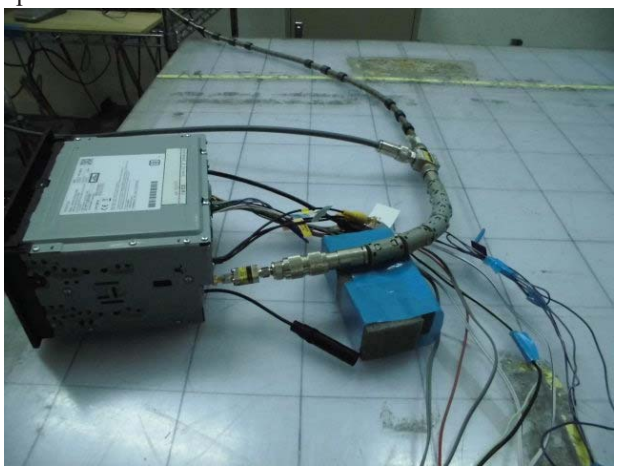
Conducted differential voltage emissions [EN 55032]

AM / FM Reception



DAB Reception



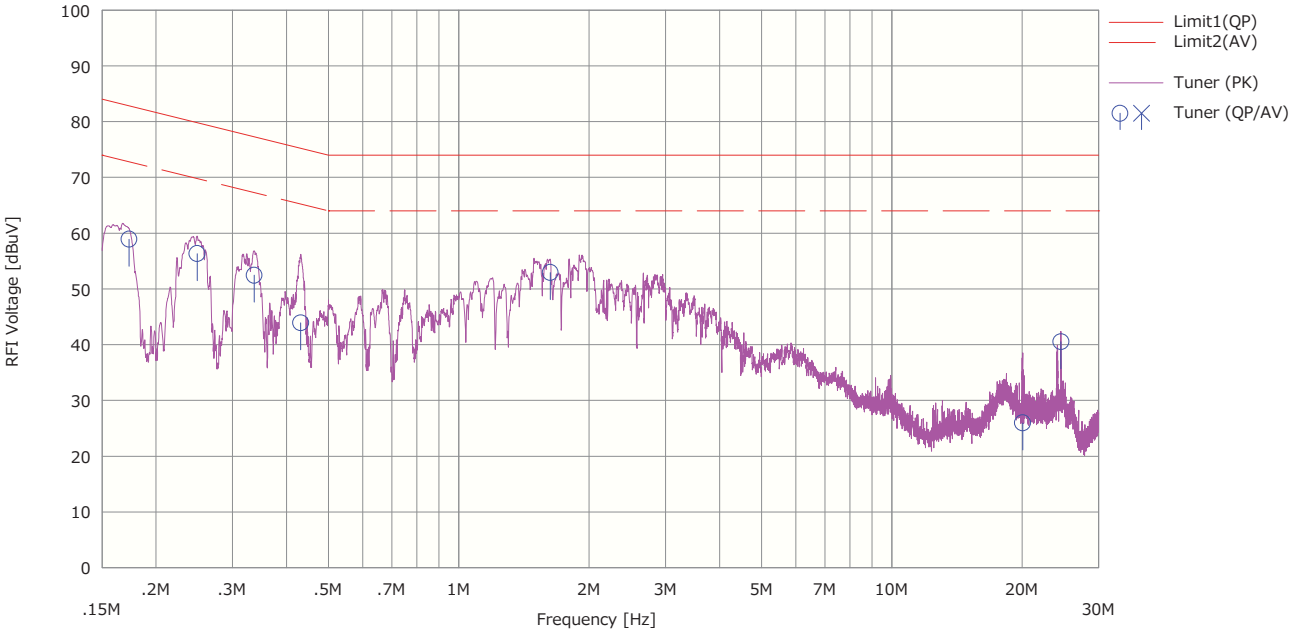


DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 7 Shielded Room
Date : 02/06/2019

Mode : 1.AM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 21 deg. C / 41 % RH

Limit : EN 55032 CLASS B Broadcast receiver tuner ports(Voltage Limit)
Engineer : Hiromichi Nakai



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		〈QP〉	〈AV〉		〈QP〉	〈AV〉	〈QP〉	〈AV〉	〈QP〉	〈AV〉		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.17328	49.00	---	9.91	58.91	---	82.80	72.80	23.89	---	Tuner	
2	0.24870	46.50	---	9.80	56.30	---	79.80	69.80	23.50	---	Tuner	
3	0.33690	42.70	---	9.75	52.45	---	77.30	67.30	24.85	---	Tuner	
4	0.43158	34.20	---	9.71	43.91	---	75.20	65.20	31.29	---	Tuner	
5	1.62600	43.20	---	9.72	52.92	---	74.00	64.00	21.08	---	Tuner	
6	20.04500	15.80	---	10.16	25.96	---	74.00	64.00	48.04	---	Tuner	
7	24.58000	30.30	---	10.21	40.51	---	74.00	64.00	33.49	---	Tuner	

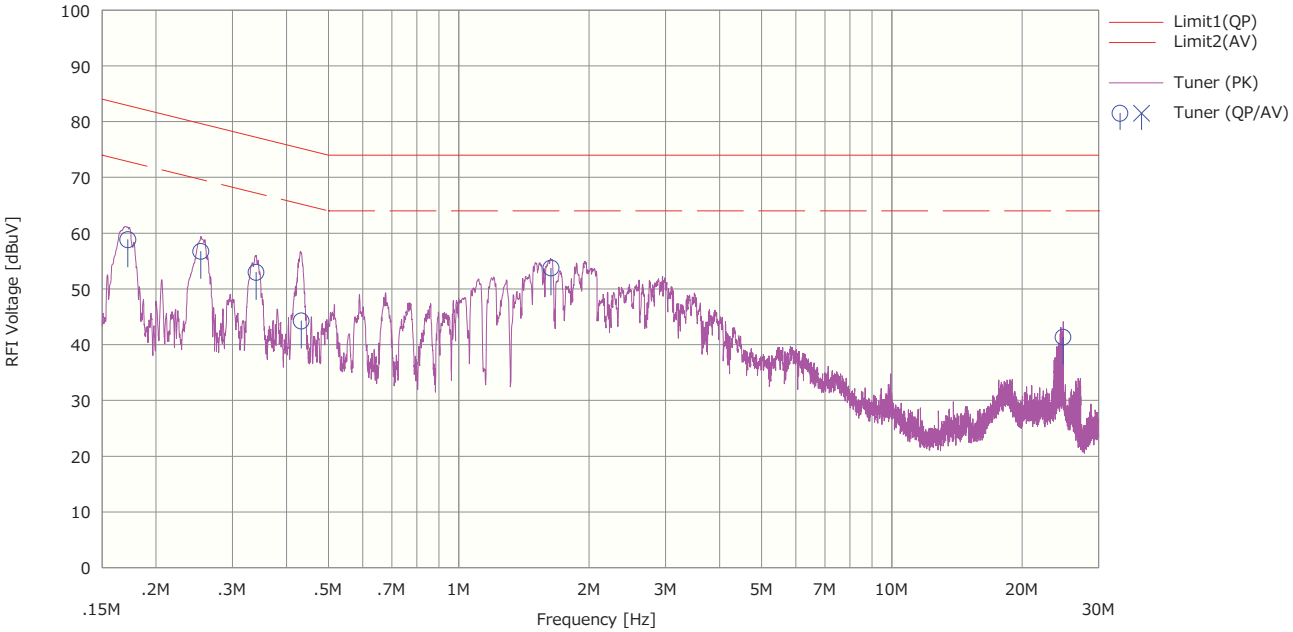
CHART:WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.
CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 7 Shielded Room
Date : 02/06/2019

Mode : 2.FM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 21 deg. C / 41 % RH

Limit : EN 55032 CLASS B Broadcast receiver tuner ports(Voltage Limit)
Engineer : Hiromichi Nakai



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		〈QP〉	〈AV〉		〈QP〉	〈AV〉	〈QP〉	〈AV〉	〈QP〉	〈AV〉		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.17223	48.90	---	9.91	58.81	---	82.90	72.90	24.09	---	Tuner	
2	0.25378	46.90	---	9.80	56.70	---	79.60	69.60	22.90	---	Tuner	
3	0.34040	43.20	---	9.74	52.94	---	77.20	67.20	24.26	---	Tuner	
4	0.43298	34.50	---	9.71	44.21	---	75.20	65.20	30.99	---	Tuner	
5	1.63400	44.00	---	9.72	53.72	---	74.00	64.00	20.28	---	Tuner	
6	24.86500	31.10	---	10.22	41.32	---	74.00	64.00	32.68	---	Tuner	

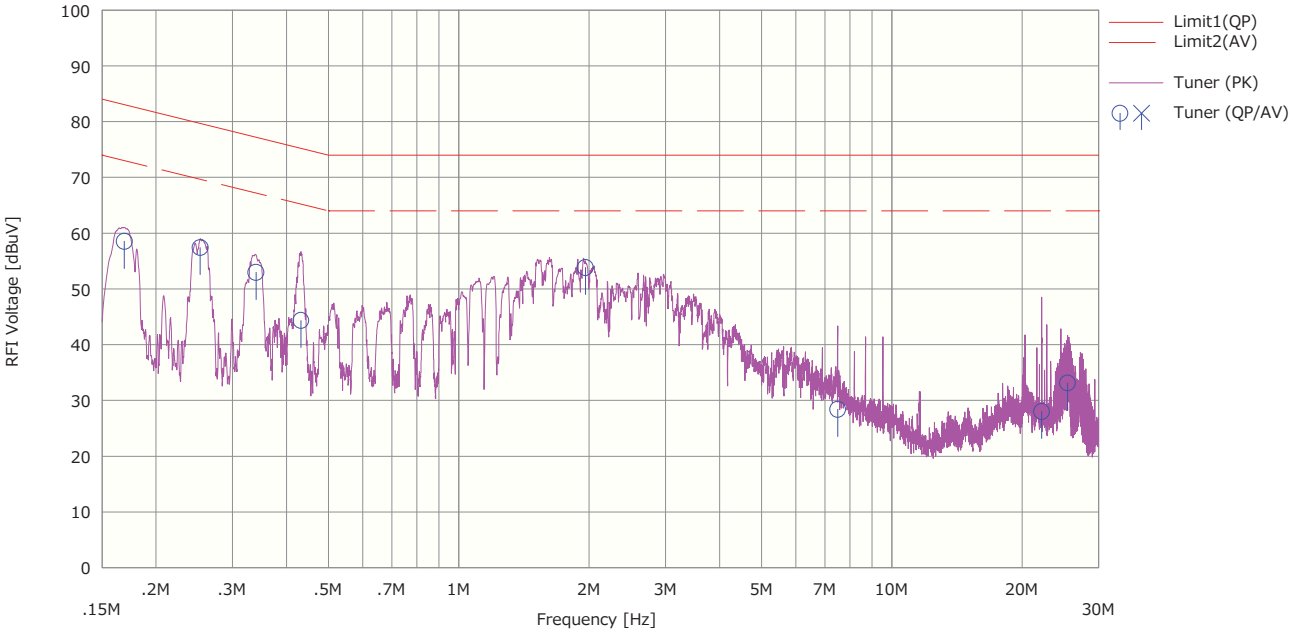
CHART:WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.
CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

DATA OF CONDUCTED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 7 Shielded Room
Date : 02/06/2019

Mode : 3.DAB Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 21 deg. C / 41 % RH

Limit : EN 55032 CLASS B Broadcast receiver tuner ports(Voltage Limit)
Engineer : Hiromichi Nakai



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		〈QP〉	〈AV〉		〈QP〉	〈AV〉	〈QP〉	〈AV〉	〈QP〉	〈AV〉		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.16908	48.60	---	9.92	58.52	---	83.00	73.00	24.48	---	Tuner	
2	0.25290	47.60	---	9.80	57.40	---	79.70	69.70	22.30	---	Tuner	
3	0.34023	43.20	---	9.74	52.94	---	77.20	67.20	24.26	---	Tuner	
4	0.43210	34.60	---	9.71	44.31	---	75.20	65.20	30.89	---	Tuner	
5	1.96000	44.10	---	9.73	53.83	---	74.00	64.00	20.17	---	Tuner	
6	7.49750	18.30	---	10.09	28.39	---	74.00	64.00	45.61	---	Tuner	
7	22.18000	17.80	---	10.19	27.99	---	74.00	64.00	46.01	---	Tuner	
8	25.46000	22.90	---	10.23	33.13	---	74.00	64.00	40.87	---	Tuner	

CHART:WITH FACTOR, Peak hold data. Except for the above table: adequate margin data below the limits.
CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F(LOSS)[dB](LISN(or ISN or Probe)+CABLE+ATTEN(Except LS-11,12,13))

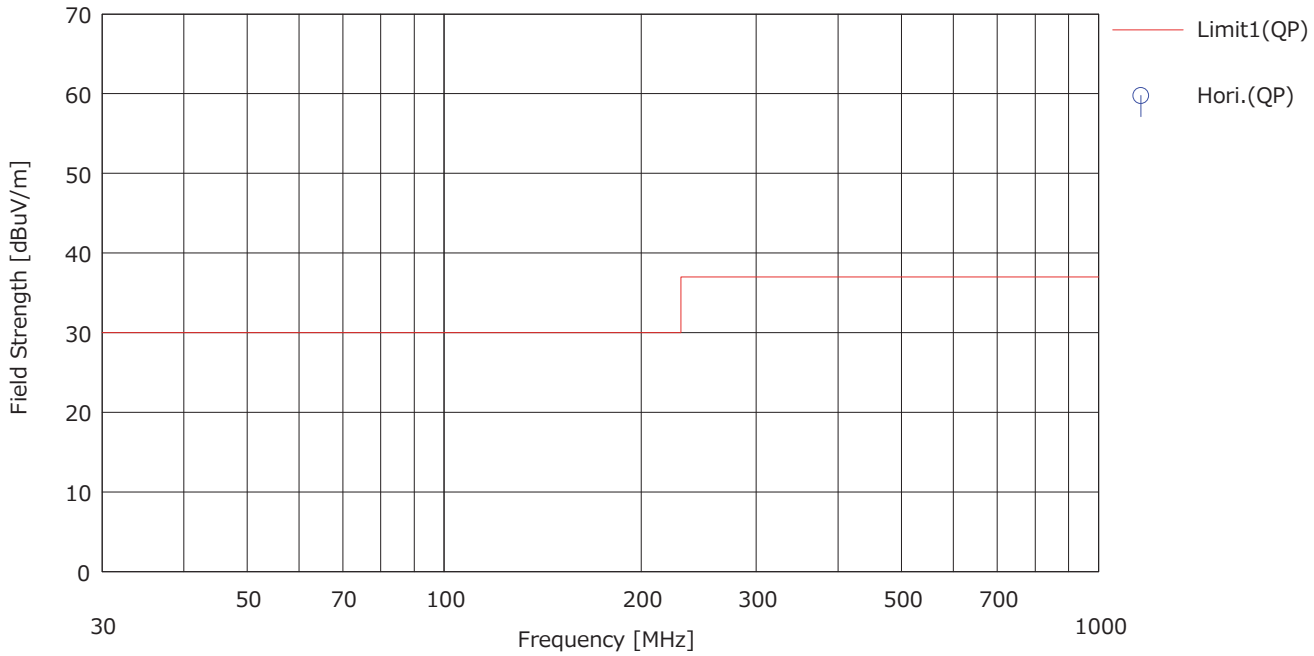
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 1.AM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi



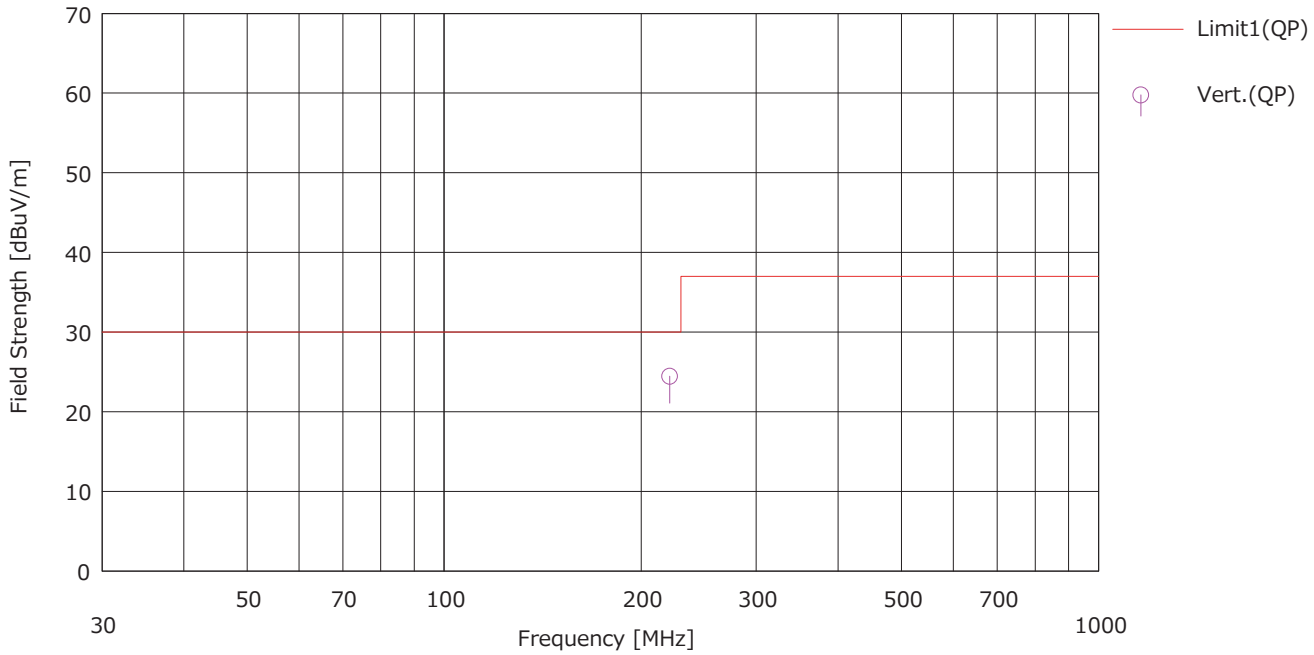


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 1.AM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi

<< QP DATA >>

No.	Freq. [MHz]	Reading 〈QP〉 [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	S.Fac [dB]	Result 〈QP〉 [dBuV/m]	Limit 〈QP〉 [dBuV/m]	Margin 〈QP〉 [dB]	Pola. [H/V]	Ant. Type	Comment
1	221.200	36.70	11.13	6.41	29.78	0.00	24.46	30.00	5.54	Vert.	LA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

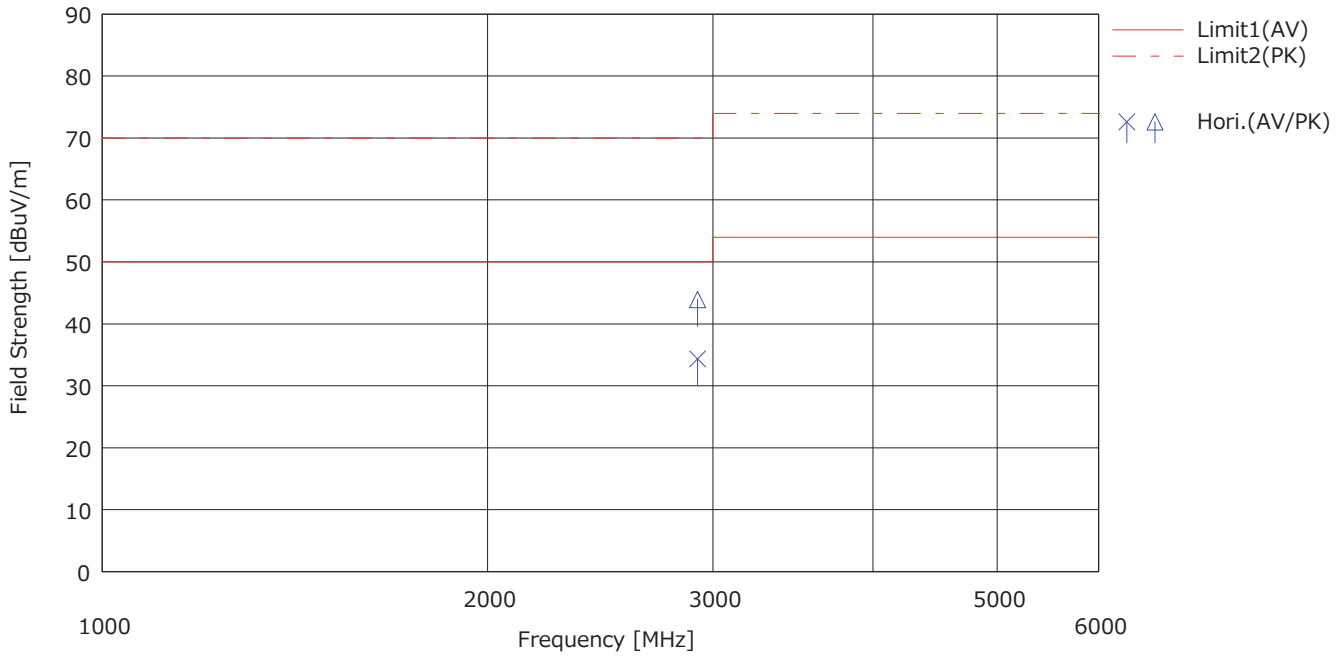
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 1.AM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita



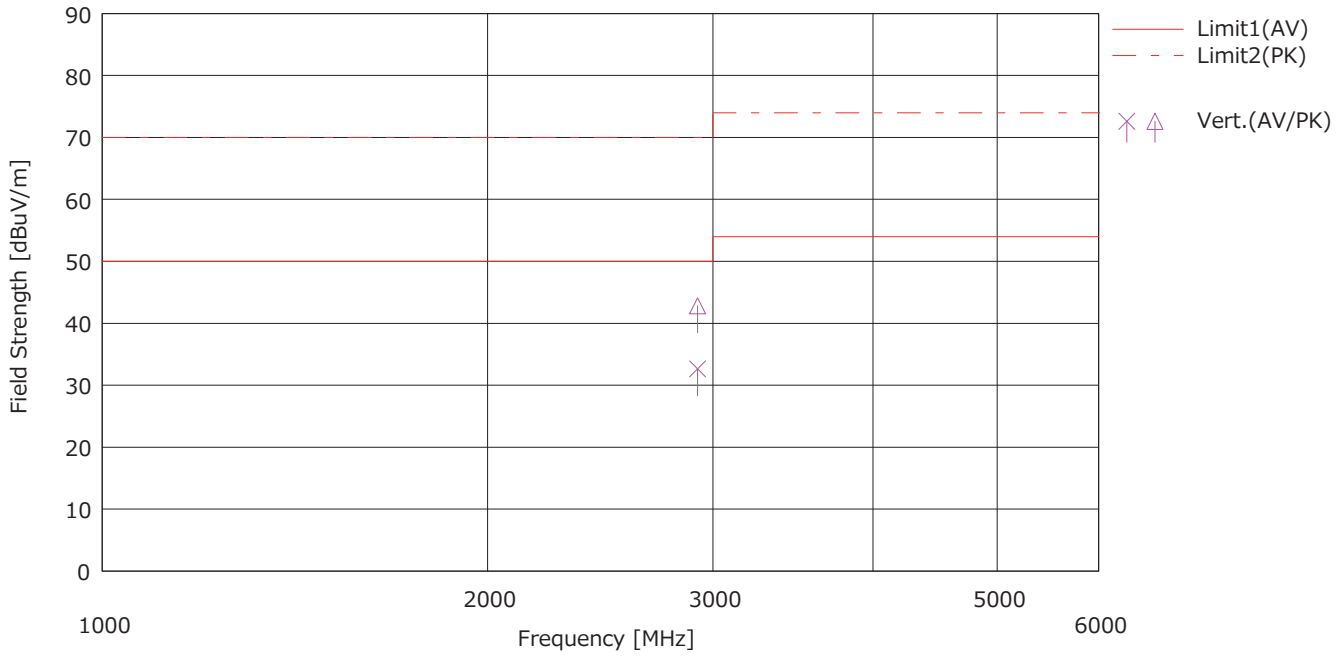


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 1.AM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita

<< AV/PK DATA >>

No.	Freq.	Reading		Ant.Fac	Loss	Gain	S.Fac	Result		Limit		Margin		Pola.	Ant. Type	Comment
		〈AV〉	〈PK〉					〈AV〉	〈PK〉	〈AV〉	〈PK〉	〈AV〉	〈PK〉			
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]		
1	2918.820	38.30	48.50	28.88	3.74	39.25	0.96	32.63	42.83	50.00	70.00	17.37	27.17	Vert.	HA	
2	2918.836	40.00	49.60	28.88	3.74	39.25	0.96	34.33	43.93	50.00	70.00	15.67	26.07	Hori.	HA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

Other harmonics were enough margin data below the limit.

********** UL Japan, Inc. **********

<<DATA OF RADIATED DISTURBANCE TEST>> 02/12/2019

Limit : EN 55032 FM (10 m)

EUT Power : DC 12 V
Test Mode : 2.FM Reception
Temp./Humid. : 16 deg. C / 36 % RH
Test site : Yokowa No.2 Open area test site
Engineer : Makoto Kashishita

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Final Result

Ch.	No.	Frequency [MHz]	Pol.	Harm	(<)	Reading (QP/AV/PK) [dB(μV)]	c.f [dB(1/m)]	Result (QP/AV/PK) [dB(μV/m)]	Limit (QP/AV/PK) [dB(μV/m)]	Margin (QP/AV/PK) [dB]
Low	1	88.869	H	F	<	33.2/ -----/ -----	-12.8	20.4/ -----/ -----	50.0/ -----/ -----	29.6/ -----/ -----
			V	F	<	33.8/ -----/ -----	-12.8	21.0/ -----/ -----	50.0/ -----/ -----	29.0/ -----/ -----
	2	177.738	H	2	<	-----/ -----/ -----	-7.9	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
			V	2	<	-----/ -----/ -----	-7.9	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
	3	266.607	H	3	<	-----/ -----/ -----	-10.5	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
			V	3	<	-----/ -----/ -----	-10.5	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
	4	355.476	H	4	<	-----/ -----/ -----	-7.3	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	4	<	-----/ -----/ -----	-7.3	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	5	444.345	H	5	<	-----/ -----/ -----	-5.5	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	5	<	-----/ -----/ -----	-5.5	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	6	533.214	H	6	<	-----/ -----/ -----	-4.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	6	<	-----/ -----/ -----	-4.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	7	622.083	H	7	<	-----/ -----/ -----	-1.3	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	7	<	-----/ -----/ -----	-1.3	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	8	710.952	H	8	<	-----/ -----/ -----	0.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	8	<	-----/ -----/ -----	0.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	9	799.821	H	9	<	-----/ -----/ -----	1.7	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	9	<	-----/ -----/ -----	1.7	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	10	888.690	H	10	<	-----/ -----/ -----	3.6	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	10	<	-----/ -----/ -----	3.6	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	11	977.559	H	11	<	-----/ -----/ -----	4.4	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	11	<	-----/ -----/ -----	4.4	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
Mid	1	96.619	H	F	<	31.2/ -----/ -----	-12.2	19.0/ -----/ -----	50.0/ -----/ -----	31.0/ -----/ -----
			V	F	<	33.3/ -----/ -----	-12.2	21.1/ -----/ -----	50.0/ -----/ -----	28.9/ -----/ -----
	2	193.238	H	2	<	-----/ -----/ -----	-6.8	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
			V	2	<	-----/ -----/ -----	-6.8	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
	3	289.857	H	3	<	-----/ -----/ -----	-9.2	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
			V	3	<	-----/ -----/ -----	-9.2	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
	4	386.476	H	4	<	-----/ -----/ -----	-7.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	4	<	-----/ -----/ -----	-7.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	5	483.095	H	5	<	-----/ -----/ -----	-4.6	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	5	<	-----/ -----/ -----	-4.6	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	6	579.714	H	6	<	-----/ -----/ -----	-2.5	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	6	<	-----/ -----/ -----	-2.5	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	7	676.333	H	7	<	-----/ -----/ -----	-0.8	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	7	<	-----/ -----/ -----	-0.8	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	8	772.952	H	8	<	-----/ -----/ -----	1.1	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	8	<	-----/ -----/ -----	1.1	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	9	869.571	H	9	<	-----/ -----/ -----	3.5	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	9	<	-----/ -----/ -----	3.5	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	10	966.190	H	10	<	-----/ -----/ -----	4.3	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	10	<	-----/ -----/ -----	4.3	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
High	1	106.971	H	F	<	33.2/ -----/ -----	-11.4	21.8/ -----/ -----	50.0/ -----/ -----	28.2/ -----/ -----
			V	F	<	30.4/ -----/ -----	-11.4	19.0/ -----/ -----	50.0/ -----/ -----	31.0/ -----/ -----
	2	213.942	H	2	<	-----/ -----/ -----	-12.3	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
			V	2	<	-----/ -----/ -----	-12.3	-----/ -----/ -----	42.0/ -----/ -----	>15.0/ -----/ -----
	3	320.913	H	3	<	-----/ -----/ -----	-8.1	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	3	<	-----/ -----/ -----	-8.1	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	4	427.884	H	4	<	-----/ -----/ -----	-5.9	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	4	<	-----/ -----/ -----	-5.9	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	5	534.855	H	5	<	-----/ -----/ -----	-4.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	5	<	-----/ -----/ -----	-4.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	6	641.826	H	6	<	-----/ -----/ -----	-1.5	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	6	<	-----/ -----/ -----	-1.5	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	7	748.797	H	7	<	-----/ -----/ -----	0.6	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	7	<	-----/ -----/ -----	0.6	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	8	855.768	H	8	<	-----/ -----/ -----	3.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	8	<	-----/ -----/ -----	3.0	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
	9	962.739	H	9	<	-----/ -----/ -----	4.3	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----
			V	9	<	-----/ -----/ -----	4.3	-----/ -----/ -----	46.0/ -----/ -----	>15.0/ -----/ -----

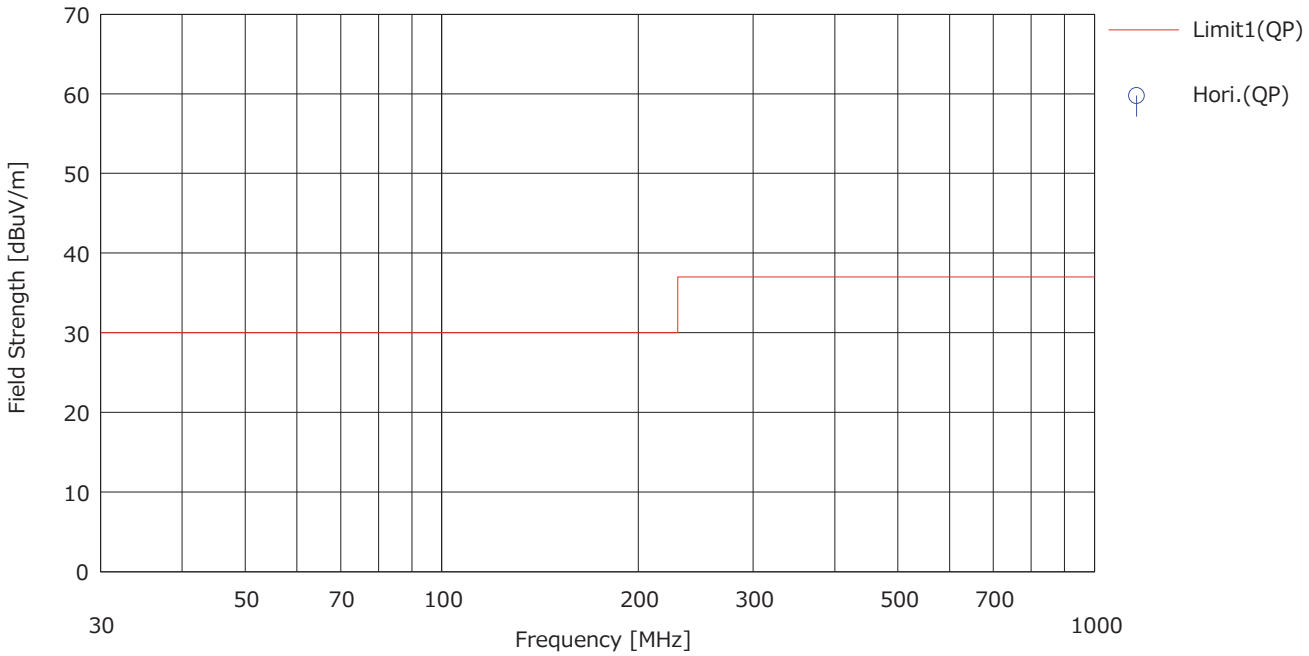
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 2.FM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi



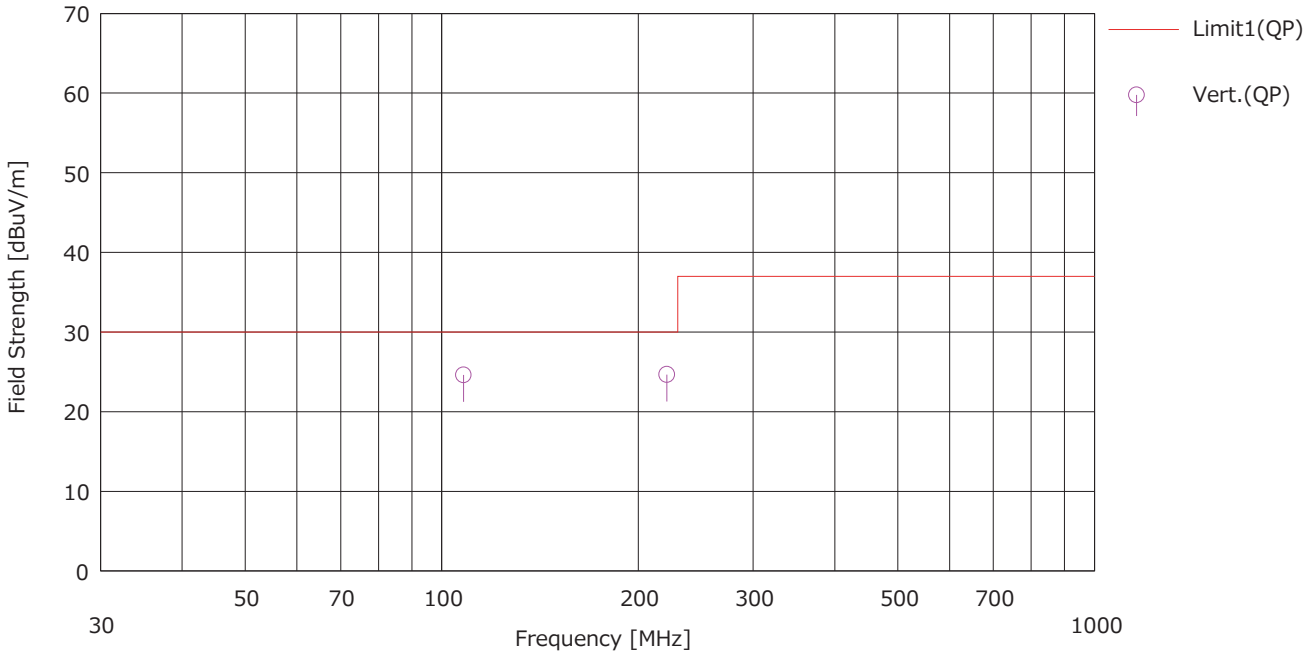


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 2.FM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi

<< QP DATA >>

No.	Freq. [MHz]	Reading 〈QP〉 [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	S.Fac [dB]	Result 〈QP〉 [dBuV/m]	Limit 〈QP〉 [dBuV/m]	Margin 〈QP〉 [dB]	Pola. [H/V]	Ant. Type	Comment
1	108.000	35.90	10.20	8.22	29.77	0.06	24.61	30.00	5.39	Vert.	BA	
2	221.200	36.90	11.13	6.41	29.78	0.00	24.66	30.00	5.34	Vert.	LA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

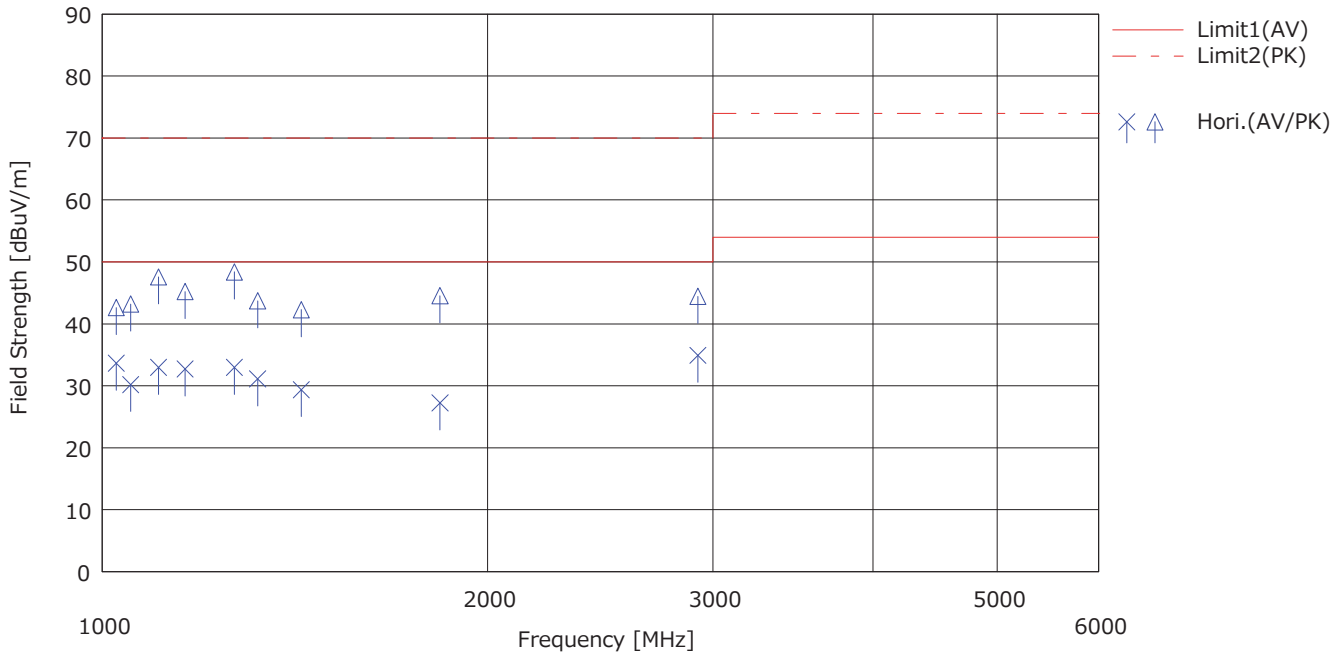
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 2.FM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita



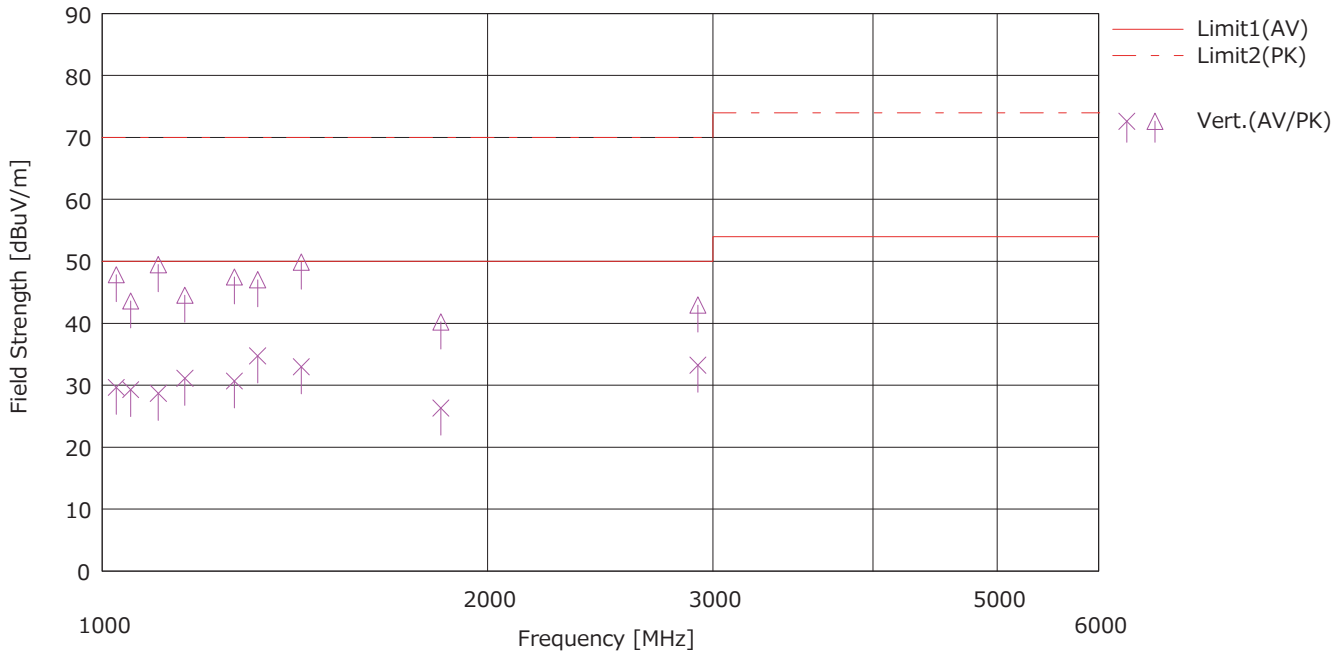


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 2.FM Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita

<< AV/PK DATA >>

No.	Freq.	Reading		Ant.Fac	Loss	Gain	S.Fac	Result		Limit		Margin		Pola.	Ant. Type	Comment
		〈AV〉	〈PK〉					〈AV〉	〈PK〉	〈AV〉	〈PK〉	〈AV〉	〈PK〉			
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]		
1	1026.009	42.30	60.50	24.08	2.39	40.10	0.96	29.63	47.83	50.00	70.00	20.37	22.17	Vert.	HA	
2	1026.009	46.30	55.30	24.08	2.39	40.10	0.96	33.63	42.63	50.00	70.00	16.37	27.37	Hori.	HA	
3	1052.978	42.60	56.90	23.38	2.41	40.06	0.96	29.29	43.59	50.00	70.00	20.71	26.41	Vert.	HA	
4	1053.079	43.50	56.50	23.38	2.41	40.06	0.96	30.19	43.19	50.00	70.00	19.81	26.81	Hori.	HA	
5	1106.800	40.40	61.20	24.86	2.45	40.00	0.96	28.67	49.47	50.00	70.00	21.33	20.53	Vert.	HA	
6	1106.978	44.70	59.30	24.86	2.45	40.00	0.96	32.97	47.57	50.00	70.00	17.03	22.43	Hori.	HA	
7	1160.980	43.20	56.60	24.40	2.49	39.93	0.96	31.12	44.52	50.00	70.00	18.88	25.48	Vert.	HA	
8	1161.037	44.80	57.30	24.40	2.49	39.93	0.96	32.72	45.22	50.00	70.00	17.28	24.78	Hori.	HA	
9	1268.871	44.20	59.60	25.03	2.58	39.80	0.96	32.97	48.37	50.00	70.00	17.03	21.63	Hori.	HA	
10	1268.981	41.90	58.70	25.03	2.58	39.80	0.96	30.67	47.47	50.00	70.00	19.33	22.53	Vert.	HA	
11	1322.980	41.90	54.50	25.37	2.62	39.73	0.96	31.12	43.72	50.00	70.00	18.88	26.28	Hori.	HA	
12	1322.980	45.50	57.80	25.37	2.62	39.73	0.96	34.72	47.02	50.00	70.00	15.28	22.98	Vert.	HA	
13	1430.982	40.10	53.00	25.20	2.71	39.60	0.96	29.37	42.27	50.00	70.00	20.63	27.73	Hori.	HA	
14	1431.019	43.70	60.60	25.20	2.71	39.60	0.96	32.97	49.87	50.00	70.00	17.03	20.13	Vert.	HA	
15	1836.271	36.60	53.90	25.76	3.03	39.10	0.96	27.25	44.55	50.00	70.00	22.75	25.45	Hori.	HA	
16	1839.368	35.60	49.50	25.82	3.03	39.10	0.96	26.31	40.21	50.00	70.00	23.69	29.79	Vert.	HA	
17	2918.938	40.60	50.10	28.88	3.74	39.25	0.96	34.93	44.43	50.00	70.00	15.07	25.57	Hori.	HA	
18	2919.205	38.90	48.60	28.88	3.74	39.25	0.96	33.23	42.93	50.00	70.00	16.77	27.07	Vert.	HA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

Other harmonics were enough margin data below the limit.

********** UL Japan, Inc. **********

<<DATA OF RADIATED DISTURBANCE TEST>> 02/12/2019

Limit : EN 55032 Class B (10 m)

Serial No. : PE-X0016
EUT Power : DC 12 V
Test Mode : 3.DAB Reception
Temp./Humid. : 16 deg. C / 36 % RH
Test site : Yokowa No.2 Open area test site
Engineer : Makoto Kashishita

****

Final Result

Ch.	No.	Frequency [MHz]	Pol.	Harm	(<)	Reading (QP/AV/PK) [dB(μV)]	c.f [dB(1/m)]	Result (QP/AV/PK) [dB(μV/m)]	Limit (QP/AV/PK) [dB(μV/m)]	Margin (QP/AV/PK) [dB]
5A	1	174.928	H	F	<	30.2/ -----/ -----	-8.0	22.2/ -----/ -----	30.0/ -----/ -----	7.8/ -----/ -----
			V	F	<	28.7/ -----/ -----	-8.0	20.7/ -----/ -----	30.0/ -----/ -----	9.3/ -----/ -----
	2	349.856	H	2	<	-----/ -----/ -----	-7.4	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	2	<	-----/ -----/ -----	-7.4	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
	3	524.784	H	3	<	-----/ -----/ -----	-4.2	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	3	<	-----/ -----/ -----	-4.2	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
	4	699.712	H	4	<	-----/ -----/ -----	-0.3	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	4	<	-----/ -----/ -----	-0.3	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
	5	874.640	H	5	<	-----/ -----/ -----	3.5	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	5	<	-----/ -----/ -----	3.5	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
9A	1	202.928	H	F	<	27.8/ -----/ -----	-12.3	15.5/ -----/ -----	30.0/ -----/ -----	14.5/ -----/ -----
			V	F	<	31.7/ -----/ -----	-12.3	19.4/ -----/ -----	30.0/ -----/ -----	10.6/ -----/ -----
	2	405.856	H	2	<	-----/ -----/ -----	-6.2	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	2	<	-----/ -----/ -----	-6.2	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
	3	608.784	H	3	<	-----/ -----/ -----	-1.5	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	3	<	-----/ -----/ -----	-1.5	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
	4	811.712	H	4	<	-----/ -----/ -----	1.9	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	4	<	-----/ -----/ -----	1.9	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
12A	1	239.200	H	F	<	26.5/ -----/ -----	-11.5	15.0/ -----/ -----	37.0/ -----/ -----	22.0/ -----/ -----
			V	F	<	28.8/ -----/ -----	-11.5	17.3/ -----/ -----	37.0/ -----/ -----	19.7/ -----/ -----
	2	478.400	H	2	<	-----/ -----/ -----	-4.8	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	2	<	-----/ -----/ -----	-4.8	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
	3	717.600	H	3	<	-----/ -----/ -----	0.1	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	3	<	-----/ -----/ -----	0.1	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
	4	956.800	H	4	<	-----/ -----/ -----	4.2	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----
			V	4	<	-----/ -----/ -----	4.2	-----/ -----/ -----	37.0/ -----/ -----	>15.0/ -----/ -----

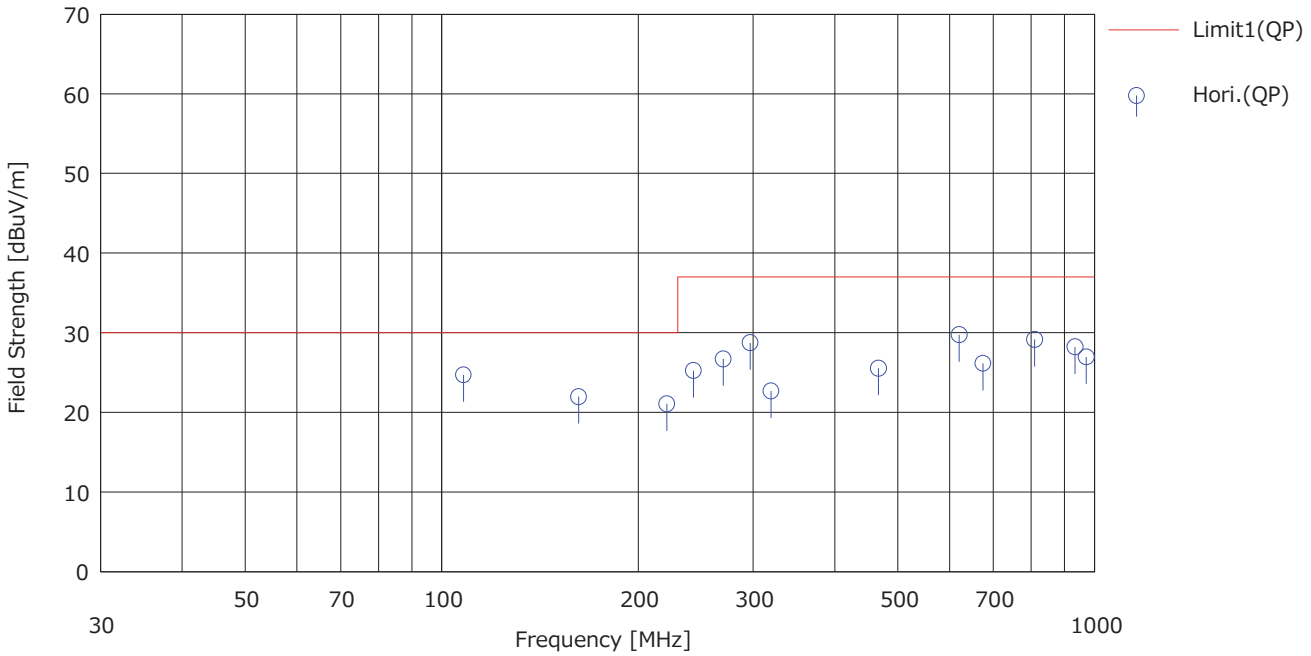
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 3.DAB Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi



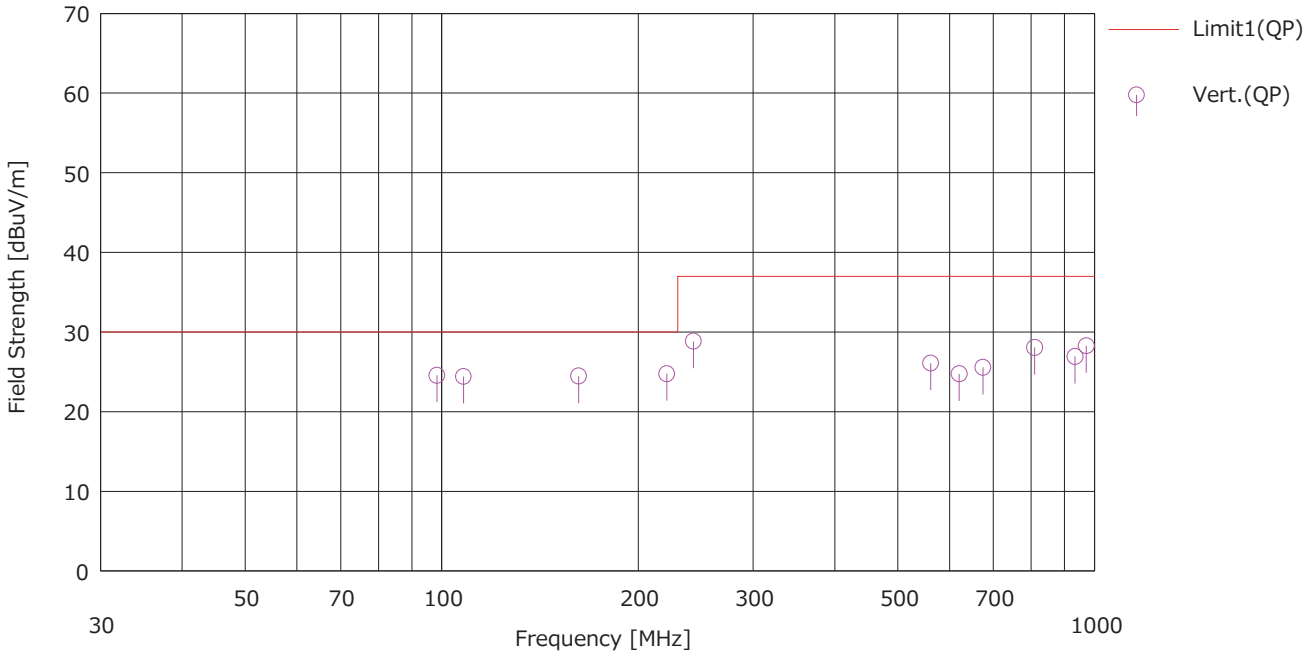


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 3.DAB Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi

<< QP DATA >>

No.	Freq. [MHz]	Reading 〈QP〉 [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	S.Fac [dB]	Result 〈QP〉 [dBuV/m]	Limit 〈QP〉 [dBuV/m]	Margin 〈QP〉 [dB]	Pola. [H/V]	Ant. Type	Comment
1	98.320	36.50	9.53	8.12	29.77	0.17	24.55	30.00	5.45	Vert.	BA	
2	108.000	35.70	10.20	8.22	29.77	0.06	24.41	30.00	5.59	Vert.	BA	
3	108.020	36.00	10.20	8.22	29.77	0.06	24.71	30.00	5.29	Hori.	BA	
4	162.000	33.00	12.20	8.80	29.76	0.22	24.46	30.00	5.54	Vert.	BA	
5	162.000	30.50	12.20	8.80	29.76	0.22	21.96	30.00	8.04	Hori.	BA	
6	221.188	37.00	11.13	6.41	29.78	0.00	24.76	30.00	5.24	Vert.	LA	
7	221.200	33.30	11.13	6.41	29.78	0.00	21.06	30.00	8.94	Hori.	LA	
8	243.000	40.30	11.70	6.63	29.80	0.00	28.83	37.00	8.17	Vert.	LA	
9	243.000	36.70	11.70	6.63	29.80	0.00	25.23	37.00	11.77	Hori.	LA	
10	270.000	37.00	12.64	6.89	29.83	0.00	26.70	37.00	10.30	Hori.	LA	
11	296.988	37.80	13.65	7.16	29.87	0.00	28.74	37.00	8.26	Hori.	LA	
12	319.400	30.80	14.45	7.31	29.89	0.00	22.67	37.00	14.33	Hori.	LA	
13	466.942	30.50	16.79	8.30	30.05	0.00	25.54	37.00	11.46	Hori.	LA	
14	561.000	29.20	18.07	8.94	30.11	0.00	26.10	37.00	10.90	Vert.	LA	
15	621.002	26.00	19.49	9.39	30.14	0.00	24.74	37.00	12.26	Vert.	LA	
16	621.010	31.00	19.49	9.39	30.14	0.00	29.74	37.00	7.26	Hori.	LA	
17	675.000	27.00	19.47	9.85	30.17	0.00	26.15	37.00	10.85	Hori.	LA	
18	675.001	26.40	19.47	9.85	30.17	0.00	25.55	37.00	11.45	Vert.	LA	
19	810.000	26.20	20.77	10.94	29.87	0.00	28.04	37.00	8.96	Vert.	LA	
20	810.000	27.30	20.77	10.94	29.87	0.00	29.14	37.00	7.86	Hori.	LA	
21	933.890	24.50	21.67	11.24	29.19	0.00	28.22	37.00	8.78	Hori.	LA	
22	933.890	23.20	21.67	11.24	29.19	0.00	26.92	37.00	10.08	Vert.	LA	
23	972.000	24.00	21.84	11.33	28.91	0.00	28.26	37.00	8.74	Vert.	LA	
24	972.010	22.70	21.84	11.33	28.91	0.00	26.96	37.00	10.04	Hori.	LA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

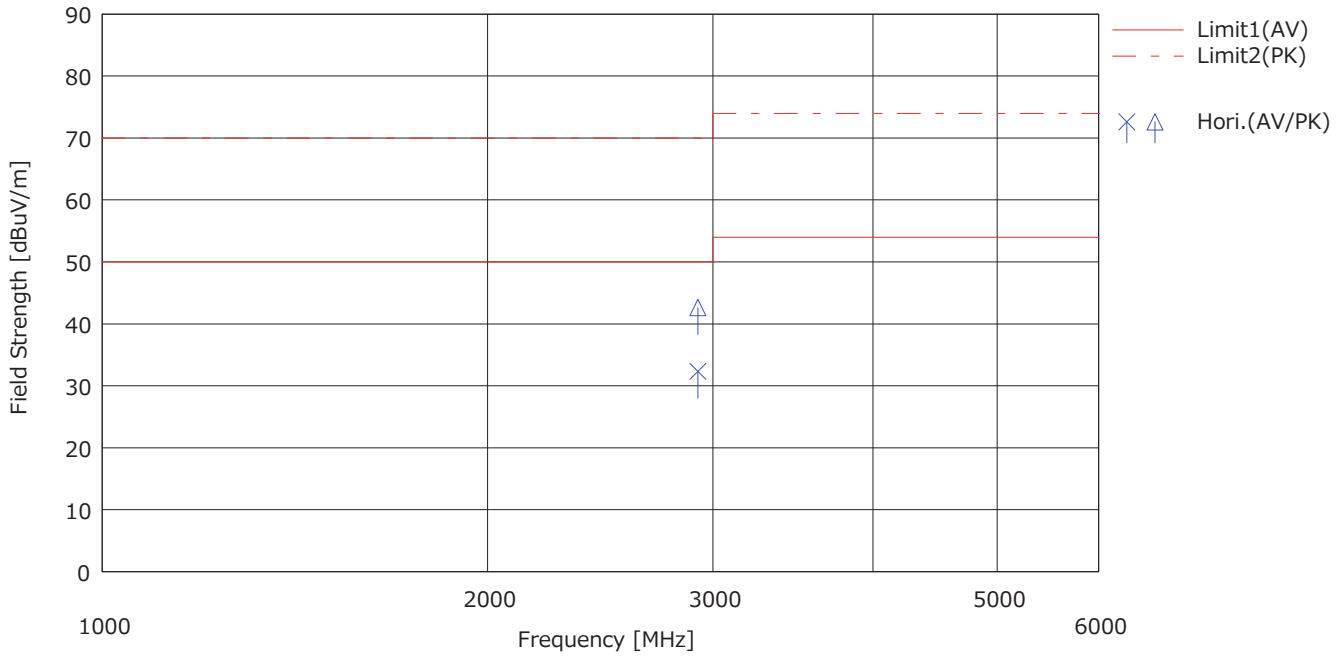
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 3.DAB Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita



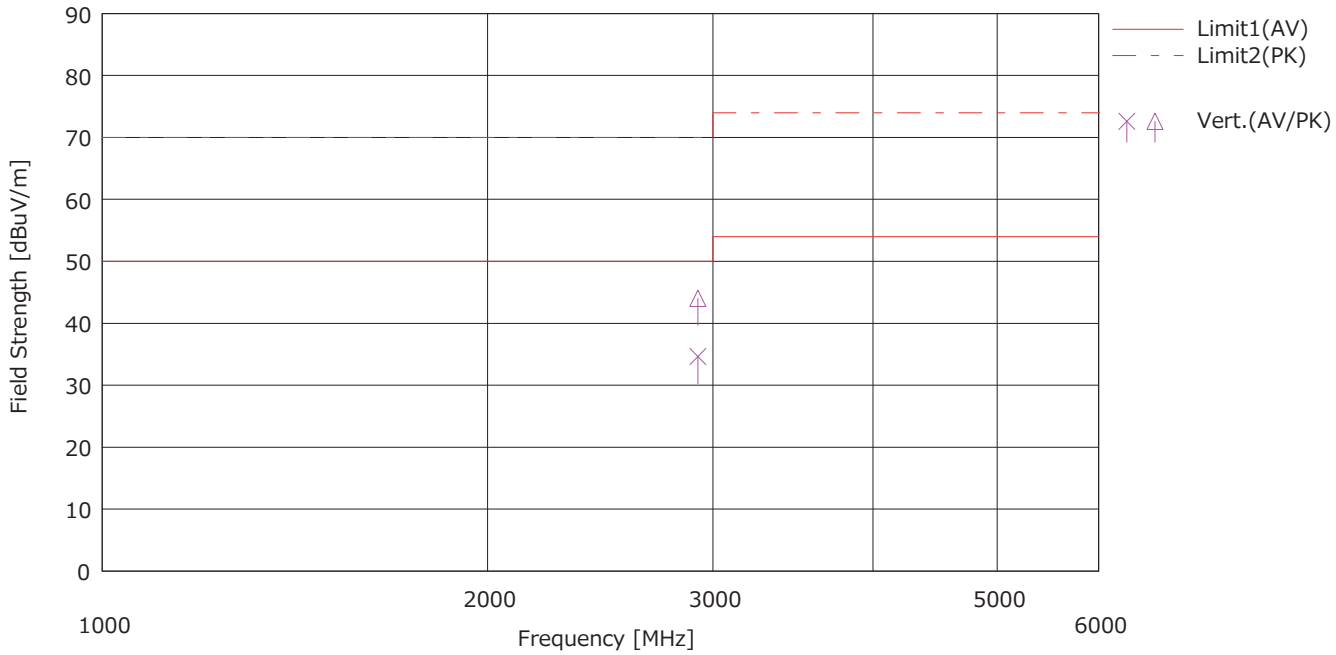


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 3.DAB Reception
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita

<< AV/PK DATA >>

No.	Freq.	Reading		Ant.Fac	Loss	Gain	S.Fac	Result		Limit		Margin		Pola.	Ant. Type	Comment
		〈AV〉	〈PK〉					〈AV〉	〈PK〉	〈AV〉	〈PK〉	〈AV〉	〈PK〉			
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]		
1	2918.986	40.30	49.70	28.88	3.74	39.25	0.96	34.63	44.03	50.00	70.00	15.37	25.97	Vert.	HA	
2	2919.000	38.00	48.30	28.88	3.74	39.25	0.96	32.33	42.63	50.00	70.00	17.67	27.37	Hori.	HA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

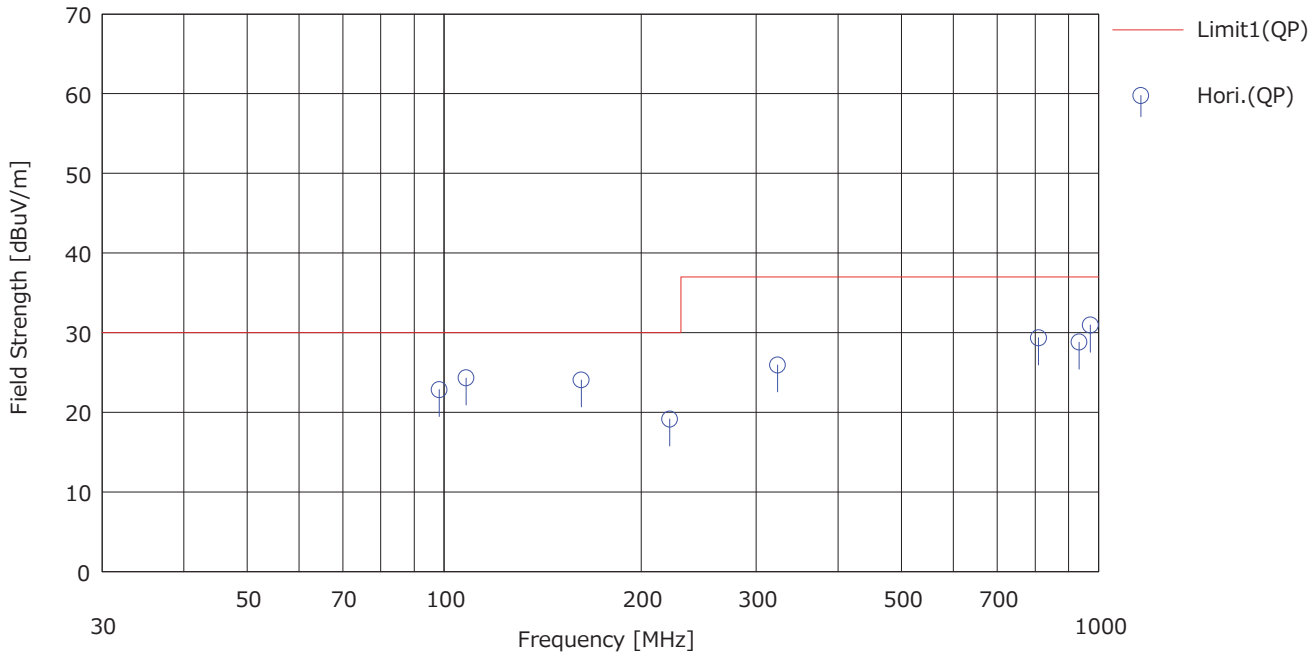
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 4.DVD Play
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi



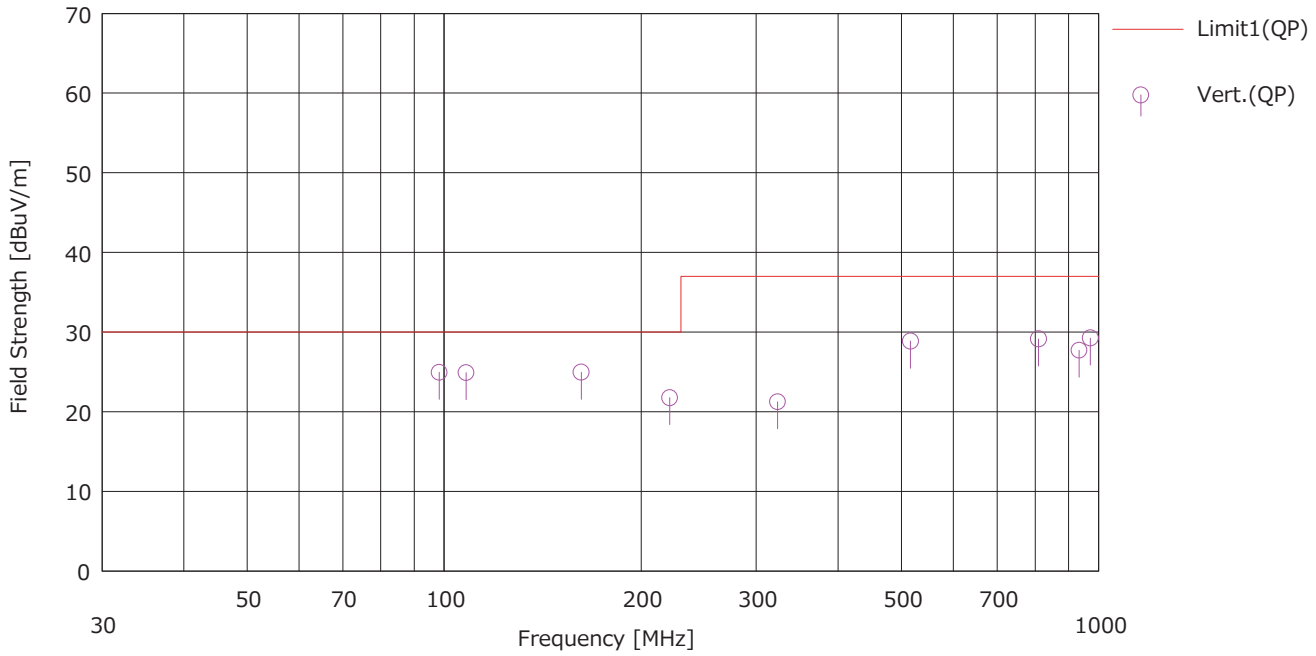


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 4.DVD Play
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi

<< QP DATA >>

No.	Freq.	Reading	Ant.Fac	Loss	Gain	S.Fac	Result	Limit	Margin	Pola.	Ant. Type	Comment
		〈QP〉					〈QP〉	〈QP〉	〈QP〉			
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]		
1	98.290	34.80	9.52	8.12	29.77	0.17	22.84	30.00	7.16	Hori.	BA	
2	98.304	36.90	9.52	8.12	29.77	0.17	24.94	30.00	5.06	Vert.	BA	
3	108.001	36.20	10.20	8.22	29.77	0.06	24.91	30.00	5.09	Vert.	BA	
4	108.010	35.60	10.20	8.22	29.77	0.06	24.31	30.00	5.69	Hori.	BA	
5	162.000	33.50	12.20	8.80	29.76	0.22	24.96	30.00	5.04	Vert.	BA	
6	162.001	32.60	12.20	8.80	29.76	0.22	24.06	30.00	5.94	Hori.	BA	
7	221.190	31.40	11.13	6.41	29.78	0.00	19.16	30.00	10.84	Hori.	LA	
8	221.200	34.00	11.13	6.41	29.78	0.00	21.76	30.00	8.24	Vert.	LA	
9	323.300	29.30	14.50	7.34	29.89	0.00	21.25	37.00	15.75	Vert.	LA	
10	323.330	34.00	14.50	7.34	29.89	0.00	25.95	37.00	11.05	Hori.	LA	
11	516.030	33.00	17.33	8.63	30.09	0.00	28.87	37.00	8.13	Vert.	LA	
12	810.000	27.30	20.77	10.94	29.87	0.00	29.14	37.00	7.86	Vert.	LA	
13	810.004	27.50	20.77	10.94	29.87	0.00	29.34	37.00	7.66	Hori.	LA	
14	933.900	24.00	21.67	11.24	29.19	0.00	27.72	37.00	9.28	Vert.	LA	
15	933.901	25.10	21.67	11.24	29.19	0.00	28.82	37.00	8.18	Hori.	LA	
16	972.000	25.00	21.84	11.33	28.91	0.00	29.26	37.00	7.74	Vert.	LA	
17	972.006	26.70	21.84	11.33	28.91	0.00	30.96	37.00	6.04	Hori.	LA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

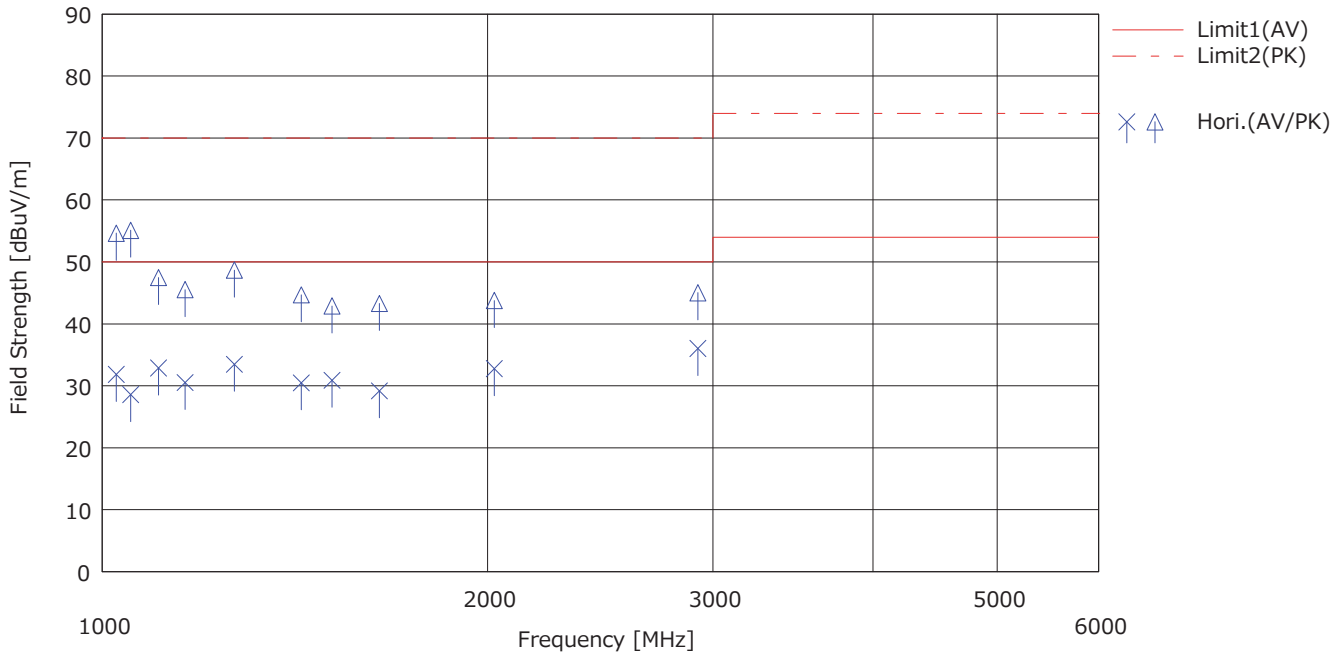
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 4.DVD Play
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita



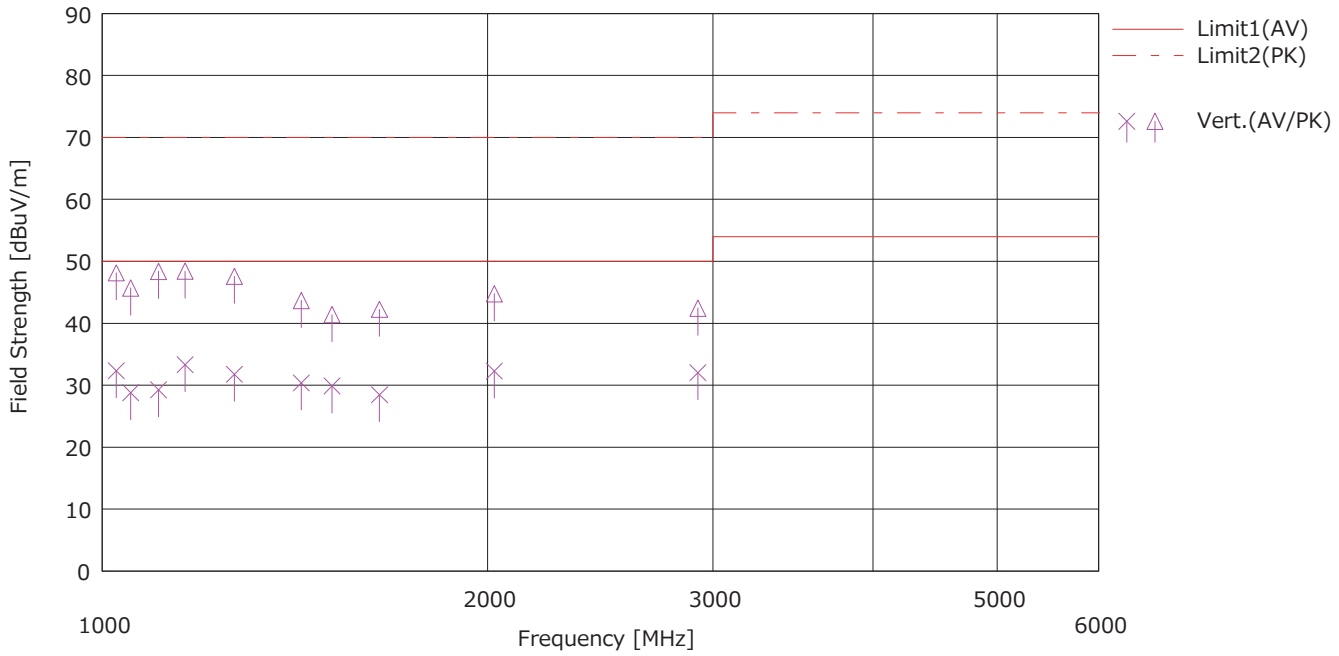


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 4.DVD Play
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita

<< AV/PK DATA >>

No.	Freq.	Reading		Ant.Fac	Loss	Gain	S.Fac	Result		Limit		Margin		Pola.	Ant. Type	Comment
		〈AV〉	〈PK〉					〈AV〉	〈PK〉	〈AV〉	〈PK〉	〈AV〉	〈PK〉			
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]		
1	1026.012	44.50	67.30	24.08	2.39	40.10	0.96	31.83	54.63	50.00	70.00	18.17	15.37	Hori.	HA	
2	1026.025	45.00	60.80	24.08	2.39	40.10	0.96	32.33	48.13	50.00	70.00	17.67	21.87	Vert.	HA	
3	1053.010	42.10	59.00	23.38	2.41	40.06	0.96	28.79	45.69	50.00	70.00	21.21	24.31	Vert.	HA	
4	1053.021	41.90	68.40	23.38	2.41	40.06	0.96	28.59	55.09	50.00	70.00	21.41	14.91	Hori.	HA	
5	1107.009	44.60	59.20	24.86	2.45	40.00	0.96	32.87	47.47	50.00	70.00	17.13	22.53	Hori.	HA	
6	1107.013	41.00	60.10	24.86	2.45	40.00	0.96	29.27	48.37	50.00	70.00	20.73	21.63	Vert.	HA	
7	1161.011	42.60	57.60	24.40	2.49	39.93	0.96	30.52	45.52	50.00	70.00	19.48	24.48	Hori.	HA	
8	1161.016	45.40	60.50	24.40	2.49	39.93	0.96	33.32	48.42	50.00	70.00	16.68	21.58	Vert.	HA	
9	1269.011	43.00	58.80	25.03	2.58	39.80	0.96	31.77	47.57	50.00	70.00	18.23	22.43	Vert.	HA	
10	1269.012	44.70	59.90	25.03	2.58	39.80	0.96	33.47	48.67	50.00	70.00	16.53	21.33	Hori.	HA	
11	1431.013	41.20	55.40	25.20	2.71	39.60	0.96	30.47	44.67	50.00	70.00	19.53	25.33	Hori.	HA	
12	1431.029	41.10	54.40	25.20	2.71	39.60	0.96	30.37	43.67	50.00	70.00	19.63	26.33	Vert.	HA	
13	1512.015	42.10	54.10	24.55	2.77	39.50	0.96	30.88	42.88	50.00	70.00	19.12	27.12	Hori.	HA	
14	1512.030	41.10	52.60	24.55	2.77	39.50	0.96	29.88	41.38	50.00	70.00	20.12	28.62	Vert.	HA	
15	1646.960	40.30	54.40	24.36	2.88	39.33	0.96	29.17	43.27	50.00	70.00	20.83	26.73	Hori.	HA	
16	1647.006	39.60	53.40	24.35	2.88	39.33	0.96	28.46	42.26	50.00	70.00	21.54	27.74	Vert.	HA	
17	2025.018	40.90	53.40	26.14	3.17	38.91	0.96	32.26	44.76	50.00	70.00	17.74	25.24	Vert.	HA	
18	2025.035	41.40	52.40	26.14	3.17	38.91	0.96	32.76	43.76	50.00	70.00	17.24	26.24	Hori.	HA	
19	2919.138	37.70	48.10	28.88	3.74	39.25	0.96	32.03	42.43	50.00	70.00	17.97	27.57	Vert.	HA	
20	2919.385	41.70	50.70	28.88	3.74	39.25	0.96	36.03	45.03	50.00	70.00	13.97	24.97	Hori.	HA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

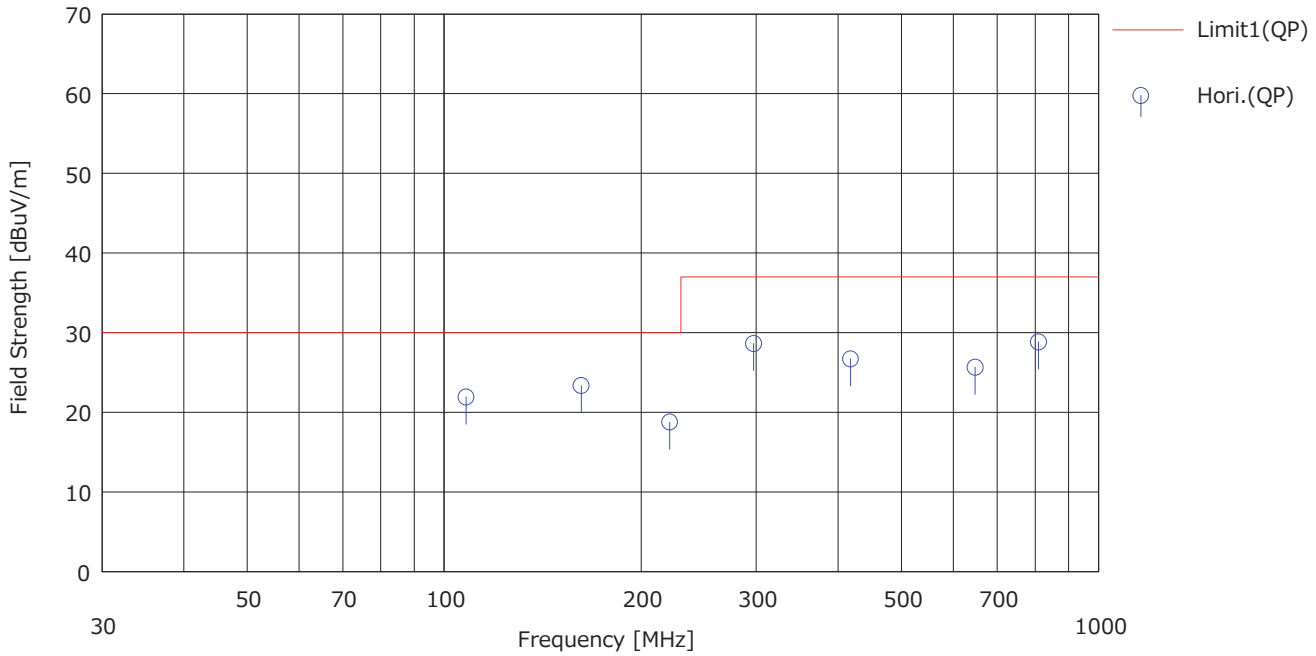
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 5.HDMI-In
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi



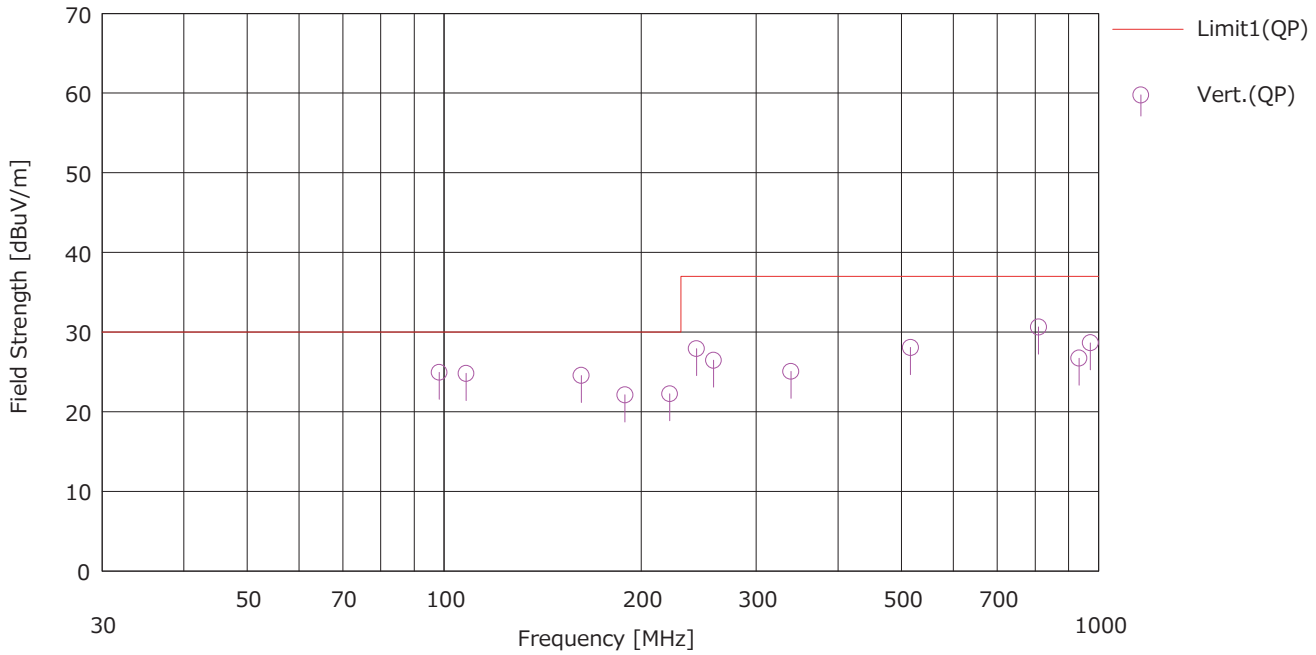


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 5.HDMI-In
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi

<< QP DATA >>

No.	Freq. [MHz]	Reading 〈QP〉 [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	S.Fac [dB]	Result 〈QP〉 [dBuV/m]	Limit 〈QP〉 [dBuV/m]	Margin 〈QP〉 [dB]	Pola. [H/V]	Ant. Type	Comment
1	98.310	36.90	9.53	8.12	29.77	0.17	24.95	30.00	5.05	Vert.	BA	
2	108.008	36.10	10.20	8.22	29.77	0.06	24.81	30.00	5.19	Vert.	BA	
3	108.012	33.20	10.20	8.22	29.77	0.06	21.91	30.00	8.09	Hori.	BA	
4	162.000	33.10	12.20	8.80	29.76	0.22	24.56	30.00	5.44	Vert.	BA	
5	162.007	31.90	12.20	8.80	29.76	0.22	23.36	30.00	6.64	Hori.	BA	
6	189.000	29.10	13.62	9.08	29.75	0.06	22.11	30.00	7.89	Vert.	BA	
7	221.182	31.00	11.13	6.41	29.78	0.00	18.76	30.00	11.24	Hori.	LA	
8	221.184	34.50	11.13	6.41	29.78	0.00	22.26	30.00	7.74	Vert.	LA	
9	243.000	39.40	11.70	6.63	29.80	0.00	27.93	37.00	9.07	Vert.	LA	
10	258.056	37.50	12.01	6.77	29.82	0.00	26.46	37.00	10.54	Vert.	LA	
11	297.200	37.70	13.65	7.16	29.87	0.00	28.64	37.00	8.36	Hori.	LA	
12	338.700	32.70	14.84	7.43	29.91	0.00	25.06	37.00	11.94	Vert.	LA	
13	418.000	32.70	16.04	7.95	29.99	0.00	26.70	37.00	10.30	Hori.	LA	
14	516.200	32.20	17.32	8.63	30.09	0.00	28.06	37.00	8.94	Vert.	LA	
15	648.000	27.00	19.18	9.62	30.15	0.00	25.65	37.00	11.35	Hori.	LA	
16	810.000	28.80	20.77	10.94	29.87	0.00	30.64	37.00	6.36	Vert.	LA	
17	810.002	27.00	20.77	10.94	29.87	0.00	28.84	37.00	8.16	Hori.	LA	
18	933.800	23.00	21.67	11.24	29.19	0.00	26.72	37.00	10.28	Vert.	LA	
19	972.000	24.40	21.84	11.33	28.91	0.00	28.66	37.00	8.34	Vert.	LA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

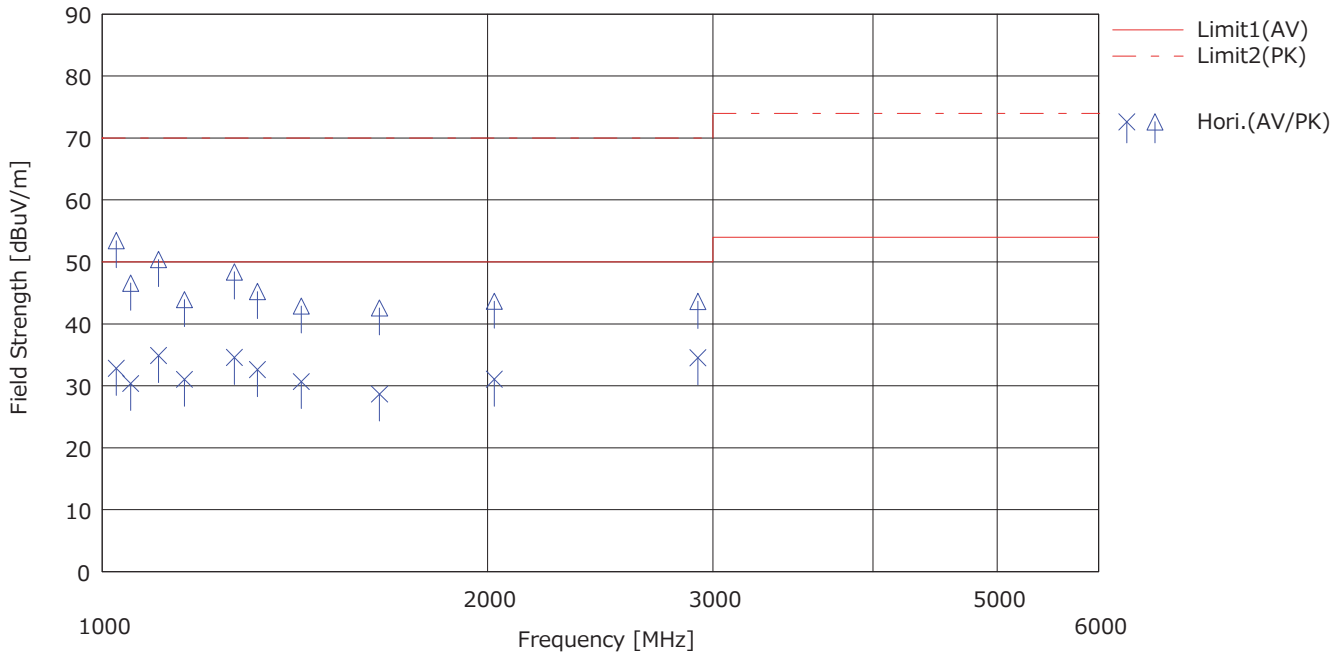
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 5.HDMI-In
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita



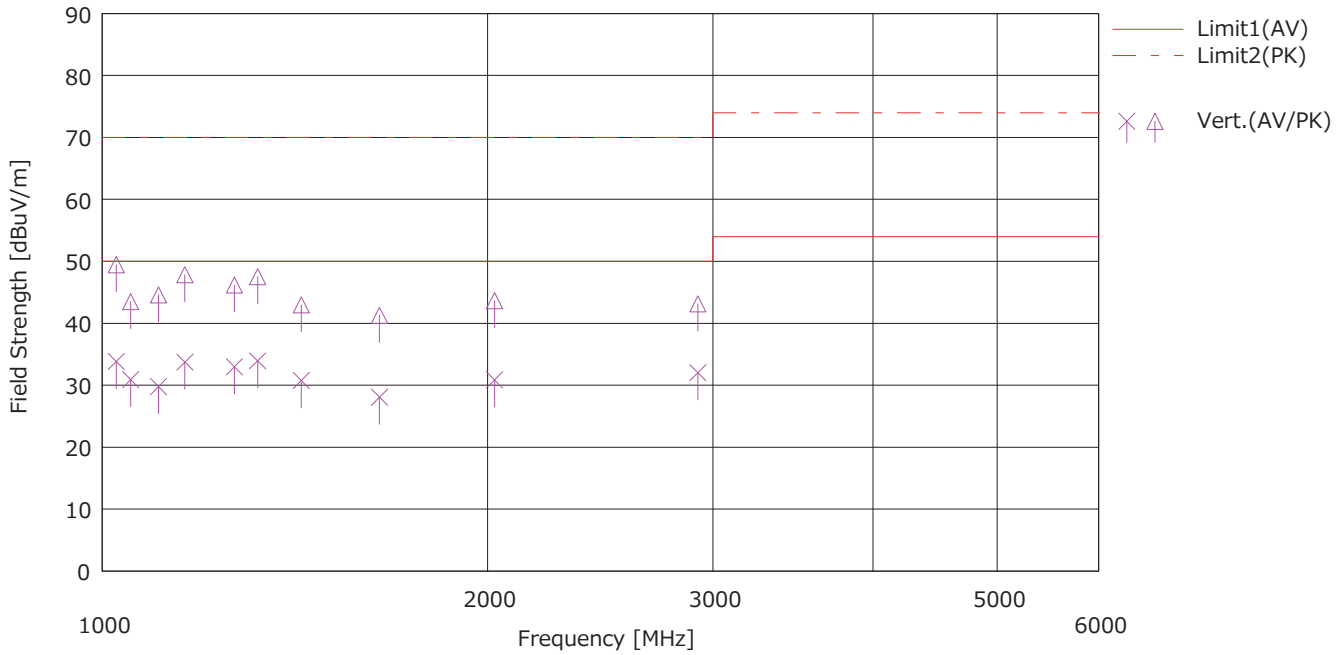


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 5.HDMI-In
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita

<< AV/PK DATA >>

No.	Freq.	Reading		Ant.Fac	Loss	Gain	S.Fac	Result		Limit		Margin		Pola.	Ant. Type	Comment
		〈AV〉	〈PK〉					〈AV〉	〈PK〉	〈AV〉	〈PK〉	〈AV〉	〈PK〉			
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]		
1	1026.009	46.50	62.10	24.08	2.39	40.10	0.96	33.83	49.43	50.00	70.00	16.17	20.57	Vert.	HA	
2	1026.099	45.50	66.10	24.07	2.39	40.10	0.96	32.82	53.42	50.00	70.00	17.18	16.58	Hori.	HA	
3	1052.800	43.70	59.90	23.37	2.41	40.07	0.96	30.37	46.57	50.00	70.00	19.63	23.43	Hori.	HA	
4	1052.978	44.20	56.80	23.38	2.41	40.06	0.96	30.89	43.49	50.00	70.00	19.11	26.51	Vert.	HA	
5	1106.978	46.60	62.10	24.86	2.45	40.00	0.96	34.87	50.37	50.00	70.00	15.13	19.63	Hori.	HA	
6	1107.007	41.50	56.30	24.86	2.45	40.00	0.96	29.77	44.57	50.00	70.00	20.23	25.43	Vert.	HA	
7	1160.001	43.10	56.00	24.40	2.49	39.93	0.96	31.02	43.92	50.00	70.00	18.98	26.08	Hori.	HA	
8	1160.979	45.80	59.90	24.40	2.49	39.93	0.96	33.72	47.82	50.00	70.00	16.28	22.18	Vert.	HA	
9	1268.922	44.20	57.40	25.03	2.58	39.80	0.96	32.97	46.17	50.00	70.00	17.03	23.83	Vert.	HA	
10	1268.980	45.80	59.60	25.03	2.58	39.80	0.96	34.57	48.37	50.00	70.00	15.43	21.63	Hori.	HA	
11	1322.298	43.40	56.00	25.37	2.62	39.73	0.96	32.62	45.22	50.00	70.00	17.38	24.78	Hori.	HA	
12	1322.959	44.70	58.30	25.37	2.62	39.73	0.96	33.92	47.52	50.00	70.00	16.08	22.48	Vert.	HA	
13	1430.800	41.50	53.70	25.20	2.71	39.60	0.96	30.77	42.97	50.00	70.00	19.23	27.03	Vert.	HA	
14	1430.984	41.40	53.60	25.20	2.71	39.60	0.96	30.67	42.87	50.00	70.00	19.33	27.13	Hori.	HA	
15	1647.016	39.20	52.40	24.35	2.88	39.33	0.96	28.06	41.26	50.00	70.00	21.94	28.74	Vert.	HA	
16	1647.068	39.80	53.70	24.35	2.88	39.33	0.96	28.66	42.56	50.00	70.00	21.34	27.44	Hori.	HA	
17	2025.042	39.70	52.30	26.14	3.17	38.91	0.96	31.06	43.66	50.00	70.00	18.94	26.34	Hori.	HA	
18	2025.111	39.50	52.30	26.14	3.17	38.91	0.96	30.86	43.66	50.00	70.00	19.14	26.34	Vert.	HA	
19	2919.061	40.20	49.30	28.88	3.74	39.25	0.96	34.53	43.63	50.00	70.00	15.47	26.37	Hori.	HA	
20	2919.064	37.70	48.80	28.88	3.74	39.25	0.96	32.03	43.13	50.00	70.00	17.97	26.87	Vert.	HA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

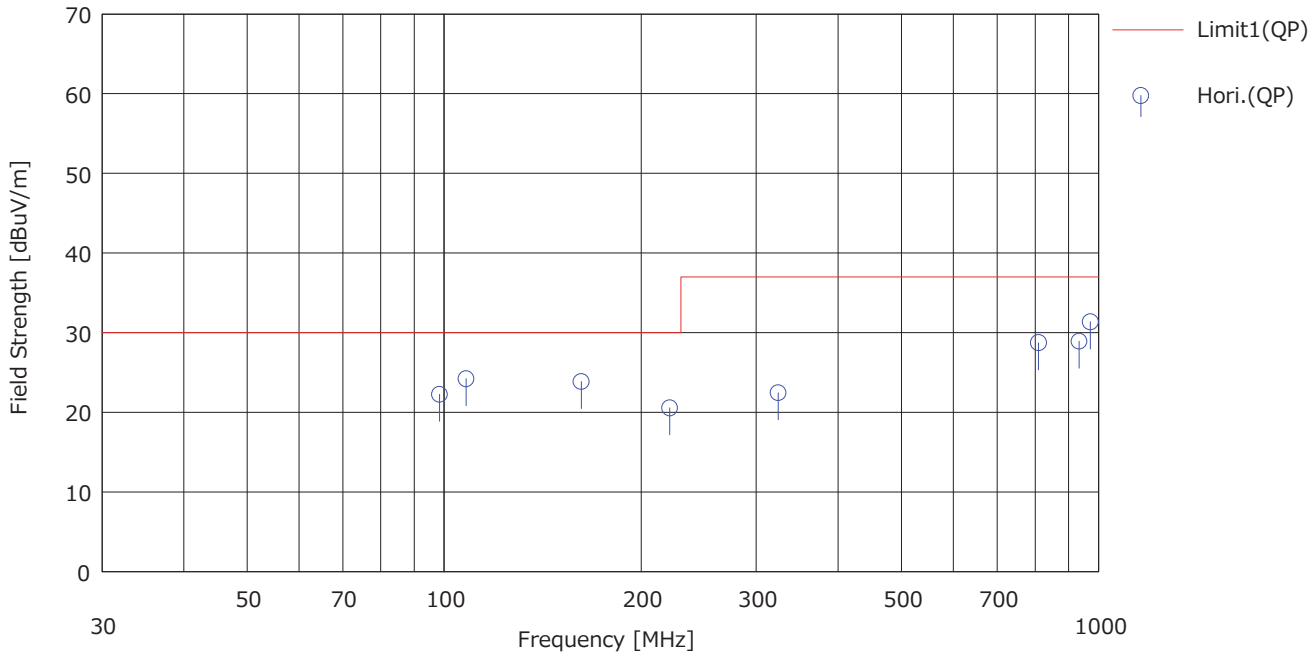
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 6.USB Play
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi



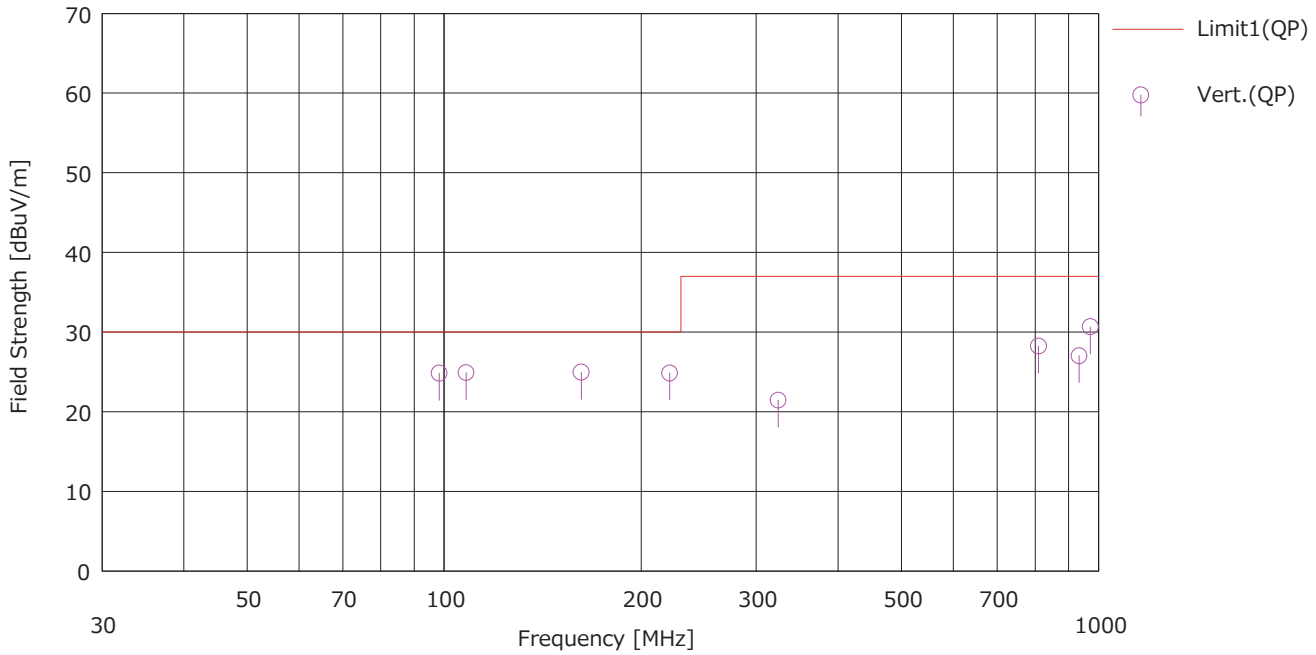


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/21/2019

Mode : 6.USB Play
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 24 deg. C / 35 % RH

Limit : EN 55032 CLASS B (10m)

Engineer : Kosuke Yamagishi

<< QP DATA >>

No.	Freq. [MHz]	Reading 〈QP〉 [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	S.Fac [dB]	Result 〈QP〉 [dBuV/m]	Limit 〈QP〉 [dBuV/m]	Margin 〈QP〉 [dB]	Pola. [H/V]	Ant. Type	Comment
1	98.308	36.80	9.53	8.12	29.77	0.17	24.85	30.00	5.15	Vert.	BA	
2	98.380	34.20	9.53	8.12	29.77	0.17	22.25	30.00	7.75	Hori.	BA	
3	108.001	36.20	10.20	8.22	29.77	0.06	24.91	30.00	5.09	Vert.	BA	
4	108.028	35.50	10.20	8.22	29.77	0.06	24.21	30.00	5.79	Hori.	BA	
5	162.004	32.40	12.20	8.80	29.76	0.22	23.86	30.00	6.14	Hori.	BA	
6	162.016	33.50	12.20	8.80	29.76	0.22	24.96	30.00	5.04	Vert.	BA	
7	221.180	37.10	11.13	6.41	29.78	0.00	24.86	30.00	5.14	Vert.	LA	
8	221.201	32.80	11.13	6.41	29.78	0.00	20.56	30.00	9.44	Hori.	LA	
9	324.001	30.50	14.51	7.34	29.90	0.00	22.45	37.00	14.55	Hori.	LA	
10	324.010	29.50	14.51	7.34	29.90	0.00	21.45	37.00	15.55	Vert.	LA	
11	809.990	26.40	20.77	10.94	29.87	0.00	28.24	37.00	8.76	Vert.	LA	
12	809.990	26.90	20.77	10.94	29.87	0.00	28.74	37.00	8.26	Hori.	LA	
13	933.910	25.20	21.67	11.24	29.19	0.00	28.92	37.00	8.08	Hori.	LA	
14	933.940	23.30	21.67	11.24	29.19	0.00	27.02	37.00	9.98	Vert.	LA	
15	972.010	27.10	21.84	11.33	28.91	0.00	31.36	37.00	5.64	Hori.	LA	
16	972.010	26.40	21.84	11.33	28.91	0.00	30.66	37.00	6.34	Vert.	LA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING+ANT FACTOR+LOSS(CABLE+ATTEN.(ATTEN: Below 1GHz only)) - GAIN(AMP)+ANSI C63.5_ΔAF

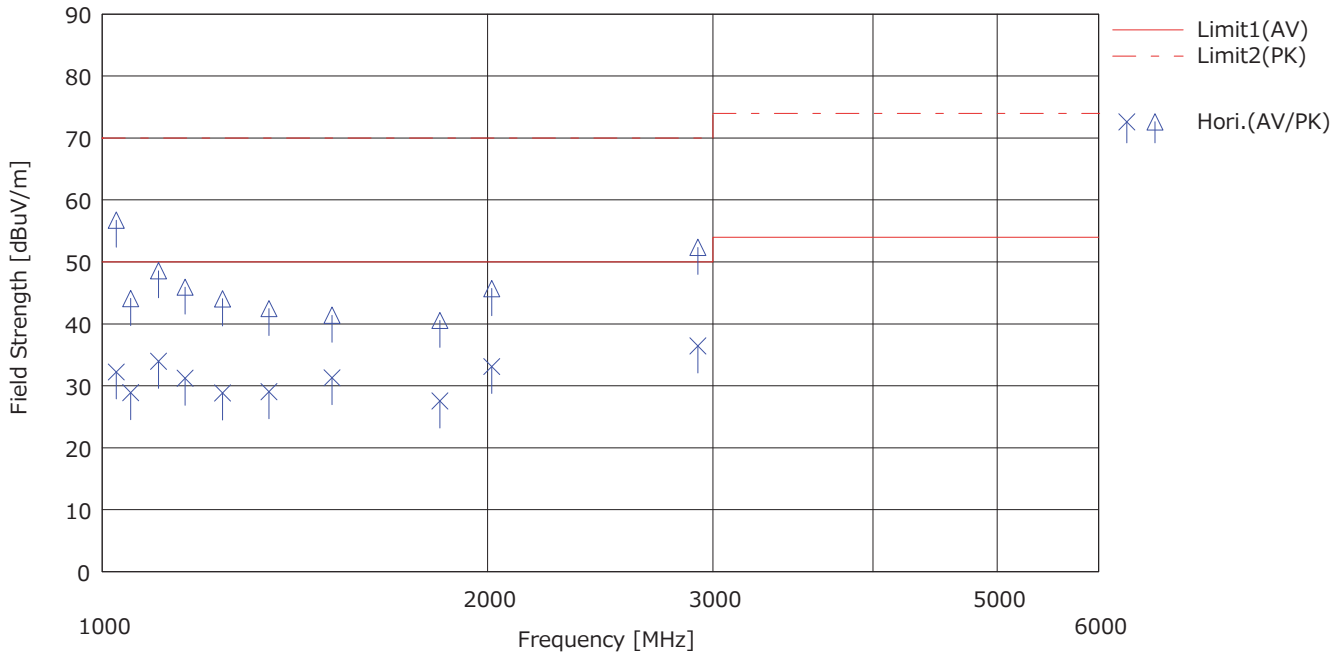
DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 6.USB Play
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita



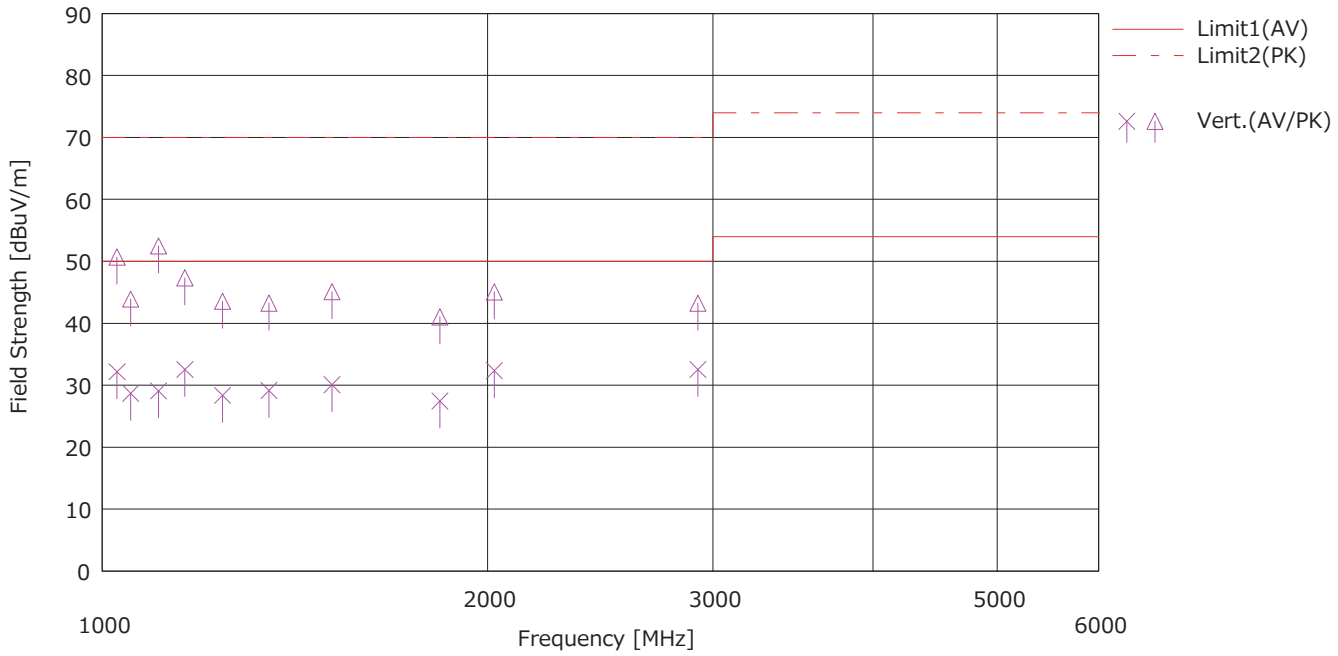


CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

DATA OF RADIATED DISTURBANCE TEST

UL Japan, Inc. Yokowa EMC Lab. No. 2 Open area test site
Date : 02/09/2019

Mode : 6.USB Play
Report No. : 12688558Y-B
Power : DC 12 V
Temp. / Humi. : 14 deg. C / 36 % RH

Limit : EN 55032 CLASS B (3m, GHz)

Engineer : Makoto Kashishita

<< AV/PK DATA >>

No.	Freq.	Reading		Ant.Fac	Loss	Gain	S.Fac	Result		Limit		Margin		Pola.	Ant. Type	Comment
		〈AV〉	〈PK〉					〈AV〉	〈PK〉	〈AV〉	〈PK〉	〈AV〉	〈PK〉			
	[MHz]	[dBuV]	[dBuV]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	[H/V]		
1	1026.010	44.90	69.40	24.08	2.39	40.10	0.96	32.23	56.73	50.00	70.00	17.77	13.27	Hori.	HA	
2	1027.600	44.90	63.40	24.02	2.40	40.10	0.96	32.18	50.68	50.00	70.00	17.82	19.32	Vert.	HA	
3	1053.004	42.00	57.20	23.38	2.41	40.06	0.96	28.69	43.89	50.00	70.00	21.31	26.11	Vert.	HA	
4	1053.011	42.20	57.40	23.38	2.41	40.06	0.96	28.89	44.09	50.00	70.00	21.11	25.91	Hori.	HA	
5	1107.004	45.70	60.30	24.86	2.45	40.00	0.96	33.97	48.57	50.00	70.00	16.03	21.43	Hori.	HA	
6	1107.008	40.80	64.20	24.86	2.45	40.00	0.96	29.07	52.47	50.00	70.00	20.93	17.53	Vert.	HA	
7	1160.986	44.60	59.40	24.40	2.49	39.93	0.96	32.52	47.32	50.00	70.00	17.48	22.68	Vert.	HA	
8	1161.011	43.30	58.00	24.40	2.49	39.93	0.96	31.22	45.92	50.00	70.00	18.78	24.08	Hori.	HA	
9	1241.997	40.50	55.70	24.65	2.56	39.83	0.96	28.84	44.04	50.00	70.00	21.16	25.96	Hori.	HA	
10	1242.012	40.00	55.20	24.65	2.56	39.83	0.96	28.34	43.54	50.00	70.00	21.66	26.46	Vert.	HA	
11	1350.028	40.00	54.10	25.25	2.64	39.70	0.96	29.15	43.25	50.00	70.00	20.85	26.75	Vert.	HA	
12	1350.071	39.90	53.30	25.25	2.64	39.70	0.96	29.05	42.45	50.00	70.00	20.95	27.55	Hori.	HA	
13	1512.014	42.50	52.60	24.55	2.77	39.50	0.96	31.28	41.38	50.00	70.00	18.72	28.62	Hori.	HA	
14	1512.015	41.30	56.30	24.55	2.77	39.50	0.96	30.08	45.08	50.00	70.00	19.92	24.92	Vert.	HA	
15	1836.026	36.90	49.90	25.75	3.03	39.10	0.96	27.54	40.54	50.00	70.00	22.46	29.46	Hori.	HA	
16	1836.049	36.80	50.40	25.75	3.03	39.10	0.96	27.44	41.04	50.00	70.00	22.56	28.96	Vert.	HA	
17	2014.978	41.70	54.30	26.18	3.16	38.91	0.96	33.09	45.69	50.00	70.00	16.91	24.31	Hori.	HA	
18	2025.019	41.00	53.70	26.14	3.17	38.91	0.96	32.36	45.06	50.00	70.00	17.64	24.94	Vert.	HA	
19	2919.461	38.20	48.90	28.88	3.74	39.25	0.96	32.53	43.23	50.00	70.00	17.47	26.77	Vert.	HA	
20	2919.466	42.10	58.00	28.88	3.74	39.25	0.96	36.43	52.33	50.00	70.00	13.57	17.67	Hori.	HA	

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-199.99MHz:BICONICAL, 200MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN
CALCULATION:RESULT = READING + ANT FACTOR + LOSS(CABLE+DISTANCE FACTOR) - GAIN(AMP). Actual distance: 3.35m.

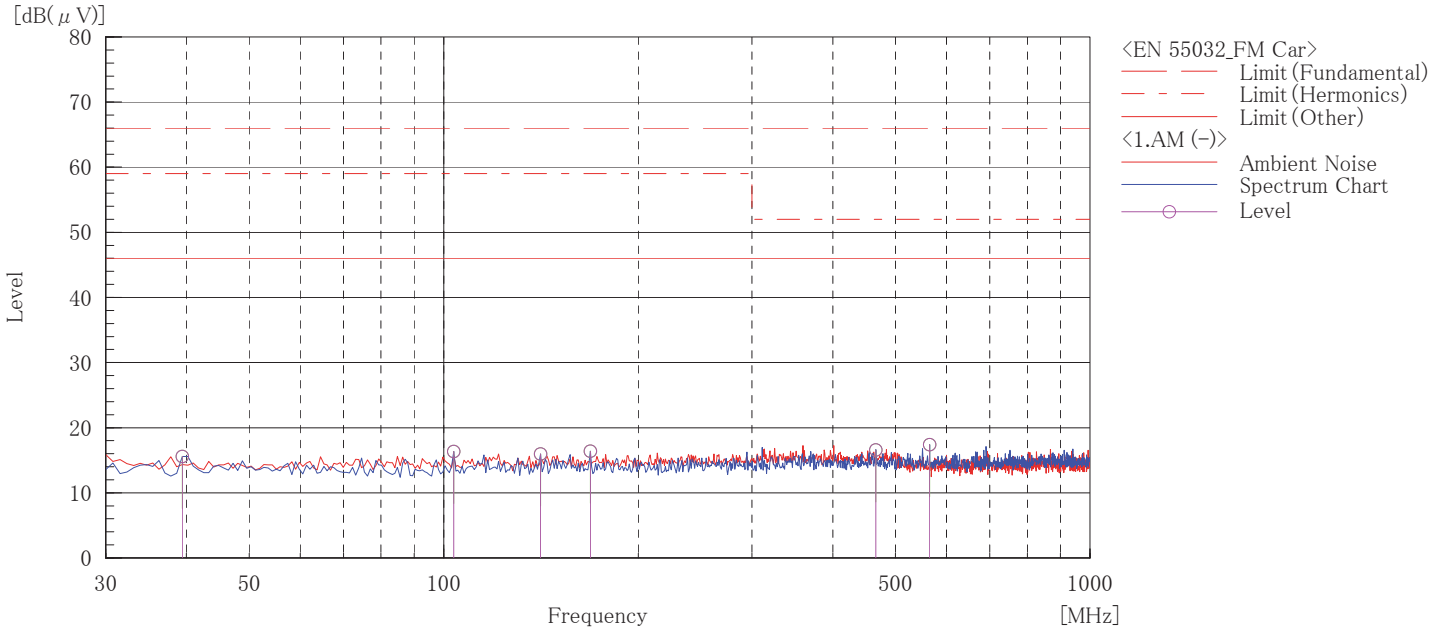
UL Japan, Inc.
Yokowa EMC Lab.

<<ANTENNA TERMINAL VOLTAGE TEST>>

02/05/2019

Limit : EN 55032_FM Car
Mode : 1.AM Reception
Temp./Hum. : 18 deg.C / 44 % RH
Engineer : Hiromichi Nakai
Test Room : No.6 Shielded Room

EUT Power : DC 12 V



Spectrum Selection

Ch. [MHz]	No.	Frequency [MHz]	Harm (<)	Reading [dB(μV)]	c.f [dB]	Result [dB(μV)]	Limit [dB(μV)]	Margin [dB]
0.999	1	39.400		29.2	-13.6	15.6	46.0	30.4
0.999	2	103.633		29.6	-13.3	16.3	46.0	29.7
0.999	3	141.233		29.0	-13.0	16.0	46.0	30.0
0.999	4	168.650		29.3	-12.9	16.4	46.0	29.6
0.999	5	466.317		29.6	-13.0	16.6	46.0	29.4
0.999	6	565.000		30.5	-13.1	17.4	46.0	28.6

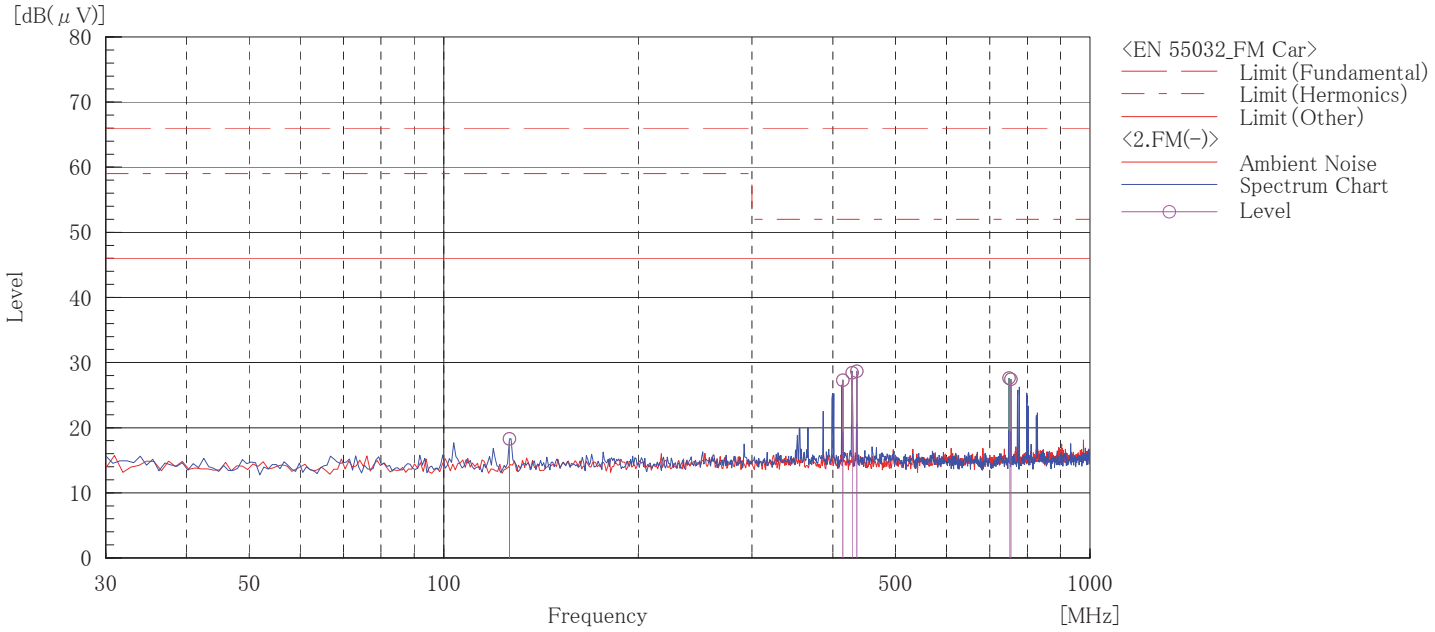
UL Japan, Inc.
Yokowa EMC Lab.

<<ANTENNA TERMINAL VOLTAGE TEST>>

02/05/2019

Limit : EN 55032_FM Car
Mode : 2.FM Reception
Temp./Hum. : 18 deg.C / 31 % RH
Engineer : Hiromichi Nakai
Test Room : No.6 Shielded Room

EUT Power : DC 12 V



Spectrum Selection

Ch. [MHz]	No.	Frequency [MHz]	Harm (<)	Reading [dB(μV)]	c.f [dB]	Result [dB(μV)]	Limit [dB(μV)]	Margin [dB]
94.0	1	126.350		31.4	-13.1	18.3	46.0	27.7
94.0	2	428.717		41.3	-12.9	28.4	46.0	17.6
94.6	3	435.767		41.6	-12.9	28.7	46.0	17.3
94.8	4	414.617		40.1	-12.8	27.3	46.0	18.7
98.0	5	749.167		40.6	-13.0	27.6	46.0	18.4
98.0	6	754.167		40.4	-13.0	27.4	46.0	18.6

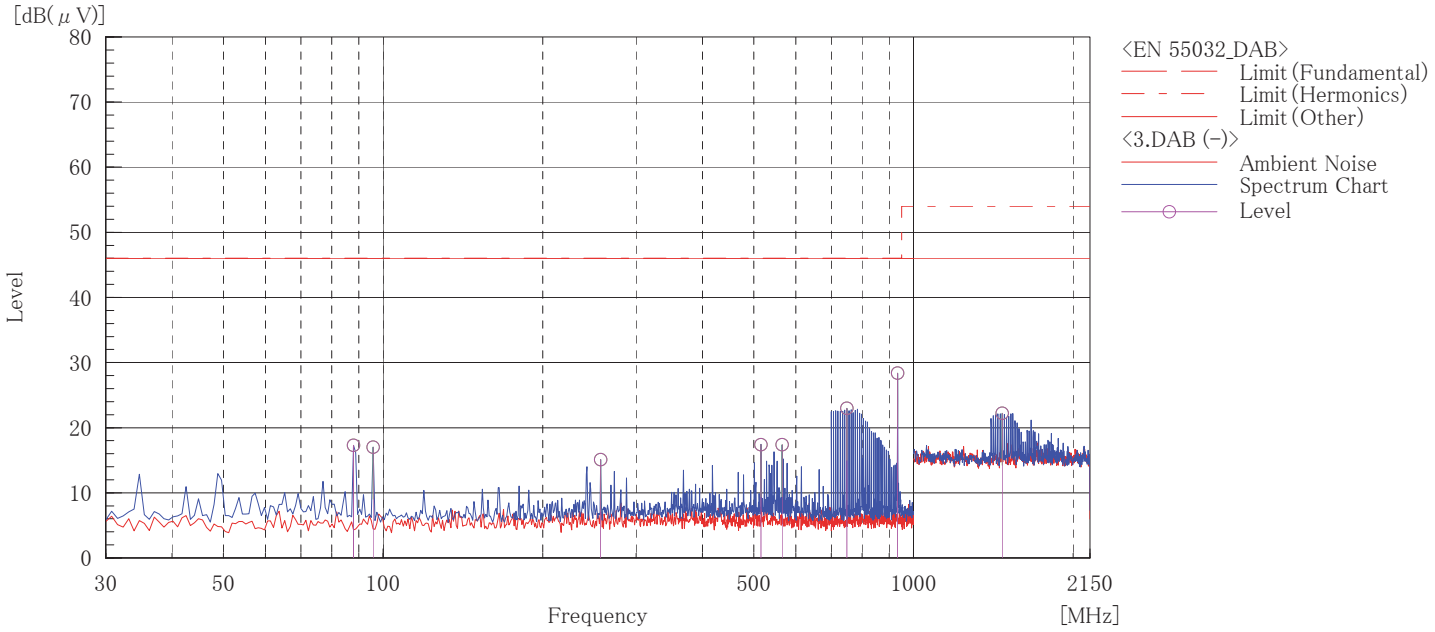
UL Japan, Inc.
Yokowa EMC Lab.

<<ANTENNA TERMINAL VOLTAGE TEST>>

02/05/2019

Limit : EN 55032_DAB
Mode : 3.DAB Reception
Temp./Hum. : 18 deg.C / 41 % RH
Engineer : Hiromichi Nakai
Test Room : No.6 Shielded Room

EUT Power : DC 12 V



Spectrum Selection

Ch.	No.	Frequency [MHz]	Harm (<)	Reading [dB(μV)]	c.f [dB]	Result [dB(μV)]	Limit [dB(μV)]	Margin [dB]
9A	1	87.967		38.6	-21.3	17.3	44.2	26.9
9A	2	95.800		38.2	-21.2	17.0	44.2	27.2
9A	3	257.167		35.5	-20.4	15.1	44.2	29.1
9A	4	515.833		38.6	-21.2	17.4	44.2	26.8
9A	5	565.000		38.7	-21.3	17.4	44.2	26.8
9A	6	748.333		44.3	-21.3	23.0	44.2	21.2
9A	7	933.333		49.2	-20.8	28.4	44.2	15.8
9A	8	1469.584		53.7	-31.5	22.2	44.2	22.0

Test report No.: 12688558Y-B

APPENDIX 3

Test Instruments

***Hyphens for Last Calibration Date, Calibration Due Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.**
The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test item

CE : Conducted disturbance
RE : Radiated disturbance
AT : Antenna terminal conducted disturbance

Test report No.: 12688558Y-B

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
RE	146577	Attenuator	ANRITSU	MP721B	6200749339	2018/7/13	2019/7/31	12
RE	171377	Biconical Antenna	Schwarzbeck	VHBB 9124 + BBA 9106	9124-1105	2018/6/29	2019/6/30	12
RE	146893	EMI Test Receiver	Rohde & Schwarz	ESU 26	100413	2018/7/27	2019/7/31	12
RE	146648	Tester	SANWA	PC500	7019227	2018/6/19	2019/6/30	12
RE	169599	Measure	KDS	ESS19-55NKM	-	-	-	-
RE	147517	Search Coil	UL Japan	-	-	-	-	-
RE	146984	Digital Humidity Indicator	SATO	PC-5000TRH	B-10	2018/4/17	2019/4/30	12
RE	146611	Pre Amplifier	ANRITSU	MH648A	M97457	2018/7/12	2019/7/31	12
RE	146625	Attenuator	ANRITSU	MP721A	6200239014	2018/7/26	2019/7/31	12
RE	146964	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	185	2018/5/31	2019/5/31	12
RE	146806	Yokowa No.2 open coaxial(0.01-1000MHz)	UL Japan	CC-21,CC-22,CC-23,CC-24,CC-25,CC-27,SW-21,SW	YO0201	2018/10/19	2019/10/31	12
RE	146944	Open area test site	JSE	3m、10m	2	2018/6/14	2019/6/30	12
RE	146601	Pre Amplifier	AGILENT	HP8449B	3008A01672	2018/11/7	2019/11/30	12
RE	146712	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-684	2018/6/5	2019/6/30	12
RE	146820	Open area test site	JSE	3m,10m	2	2018/2/2	2019/2/28	12

Test report No.: 12688558Y-B

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
RE	146880	Microwave Cable	Junkosha	MWX221-02000AMSDMS	1502S360	2018/3/19	2019/3/31	12
RE	146808	Microwave Cable	Junkosha	MWX221-05000AMSDMS	1502S361	2018/3/19	2019/3/31	12
CE	146968	LISN(AMN)	Schwarzbeck	NSLK8127	8127305	2018/10/3	2019/10/31	12
CE	146950	Coupling decoupling network	FCC	TSCDN-S1-BNC-75	4008	2018/11/12	2019/11/30	12
CE	146878	Yokowa No7 Shielded room(CE)	UL Japan	CC-71,CC-72,CC-73,CC-75,SW-71,SW-72	-	2018/8/8	2019/8/31	12
CE	146983	Digital Humidity Indicator	SATO	PC-5000TRH	B-09	2018/3/27	2019/3/31	12
AT	146736	Thermo-Hygrometer	CUSTOM	CTH-201	510Q06R	2018/3/27	2019/3/31	12
AT	146634	Matching Pad	TME	ZT-130	500101	2018/10/19	2019/10/31	12
AT	146715	Power Combiner	Mini-Circuit	ZFRSC-2050	-	2018/10/19	2019/10/31	12
AT	160511	75Ω Cable	ULJapan	-	-	2018/11/9	2019/11/30	12
AT	146763	50Ω Coaxil Cable(Antenna Terminal)	UL Japan	50-N-N-SP	YSP03	2018/3/2	2019/3/31	12
AT	146764	50Ω Coaxil Cable(Antenna Terminal)	UL Japan	50-N-N-SP	YSP04	2018/3/2	2019/3/31	12
AT	146765	50Ω Coaxil Cable(Antenna Terminal)	UL Japan	50-N-N-SP	YSP05	2018/3/2	2019/3/31	12
AT	151789	Pre Amplifier	HEWLETT PACKARD	8447D	2944A09947	2018/3/2	2019/3/31	12
AT	146600	Pre Amplifier	HEWLETT PACKARD	8449B	3008A01207	2018/7/20	2019/7/31	12

Test report No.: 12688558Y-B

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
AT	146723	Software for Antenna Terminal Voltage	Toyo Corporation	-	-	-	-	-
CE RE	146923	EMI measurement program	TSJ	TEPTO-DV	-	-	-	-
CE AT	146755	Test Receiver	Rohde & Schwarz	ESCI	100768	2018/10/9	2019/10/31	12
CE AT	146650	Tester	SANWA	PC500	7019239	2018/6/19	2019/6/30	12
CE AT	147545	Measure	-	-	-	-	-	-
CE AT	146833	Barometer	Sunoh	SBR121	2347	2018/9/19	2021/9/30	36
CE RE AT	148701	Broadcast Tester	Rohde & Schwarz	SFE	2112.4300K02-121168-Li	2019/1/7	2020/1/31	12

End of Report